Fiscal Impacts of Alternative Land Use Scenarios for the Matanuska-Susitna Borough, Alaska

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Executive Summary

This paper presents the projected fiscal impacts on Alaska's Matanuska-Susitna Borough (MSB) and its taxpayers, through year 2050, of six alternative land use and population scenarios. The analysis is focused on population growth and education spending, due to the overwhelming importance of school expenditures in overall borough finances.

The Mat-Su Borough is Alaska's fastest growing borough. Between 2000 and 2012, MSB population grew by 3.8% per year, from about 60,000 to about 94,000. Also, real[1] total school expenditures per student (both operating plus capital) increased by 1.6% per year between 2003 and 2012. The State of Alaska currently pays 71% of these total education costs.[2] With Alaska oil production decreasing, state education spending per student is likely to decline. Population growth could therefore be costly to MSB residents if school and other costs increase faster than available financial resources.

Scenarios considered

A base case scenario – assuming no changes in land use policy – is used as a benchmark for estimating fiscal impacts. In the base case, MSB population grows by 2% per year and reaches almost 200,000 in 2050. The alternative scenarios are:

Scenario 1 - Higher density in the Western Knik Goose Bay Road corridor and Point MacKenzie areas due to water & sewer availability

This scenario simulates the higher residential development density that would be possible if a large-scale domestic water and sewer system were installed to serve this area. The year 2050 MSB population is increased by 42,497 people.

Scenario 2 - Significant farmland removed from development

A total of 19,431 acres of significant farmland south of Palmer, northwest of Palmer, and in the Point MacKenzie area are set aside for agricultural use. The year 2050 MSB population is reduced by 3,489 people.

Scenario 3 – Key natural areas preserved

Significant natural, aquifer infusion and wetland areas totaling 121,846 acres are removed from development consideration. The year 2050 MSB population is reduced by 21,669 people.

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[1] The term "real" means after adjustment for inflation.

[2] It is a coincidence that the share of total costs is very close to the statutory 70% rate for state reimbursement of school construction debt.

Scenario 4 - Transit-linked higher density nodes along the Parks Highway and eastern Knik Goose Bay corridor

Scenario 4 simulates higher-density, nodal residential land uses in the form of town centers at additional transit nodes along the Parks Highway and eastern Knik Goose Bay Road corridor. The year 2050 MSB population is increased by 14,140, but there is a 25% savings in infrastructure capital costs per capita for these additional people.

Scenario 5 – Knik Arm Bridge is built

This scenario assumes that the Knik Arm Bridge is built and that the resulting residential density in the Western Knik Goose Bay Road Corridor and Point MacKenzie area is consistent with recent KABATA[3] estimates. The year 2050 MSB population is increased by 23,270 people.

Scenario 6: Significantly lower densities in the North Susitna Valley

Scenario 6 simulates an average 75% reduction in density from the base case throughout the North Susitna Valley (north of Willow). The year 2050 MSB population is reduced by 62,765 people.

Table ES-1 summarizes the effects on population of the six alternative scenarios.

Table ES-1. Alternative land use scenarios

	Scenario description	Population in 2050	Higher or (lower) population vs. base	
	Base Case	199,074	0	
1	Increased density in the Knik-Goose Bay and Point MacKenzie areas due to water & sewer availability	241,571	42,497	
2	Significant farmland removed from development	195,585	(3,489)	
3	Key natural areas preserved	177,405	(21,669)	
4	Nodal development with higher residential density	213,214	14,140	*
5	Knik Arm Bridge is built	222,344	23,270	
6	Significantly lower densities in the North Susitna Valley	136,309	(62,765)	

*population increase not considering any mitigating reduction in densities in other areas.

[3] Knik Arm Bridge and Toll Authority

Results

In the base case, a fiscal shortfall develops as projected education expenditures grow with population while projected state support does not. The shortfall reaches $217.7 million by 2050, equivalent to almost $1,100 per person. If a sales tax were used to cover the shortfall, the required rate would range from 2.5% in 2020 to 16.8% in 2050.

In the alternative scenario projections, increased population causes an increased fiscal shortfall, while decreased population reduces the shortfall (Table ES-2). For example, in Scenario 3 – the preservation of key natural areas – the annual shortfall is reduced by $28.3 million in 2050 and the cumulative shortfall is reduced by $400 million.

Table ES-2. MSB budget shortfall under six land use scenarios, relative to base case

		Budget shortfall (millions of 2012 dollars)				
Scenario	**Population in 2050**	**2020**	**2030**	**2040**	**2050**	**cumulative 2014-2050**
Base case	199,074	17.6	73.1	140.9	217.7	3,395.6
Difference, higher or (lower), from base case:						
1. Increased Density KGB PMK	42,497	1.8	13.2	30.5	50.9	722.0
2. Farmland Set Aside	(3,489)	(0.1)	(0.6)	(3.8)	(5.6)	(65.1)
3. Key Natural Priorities	(21,669)	(1.4)	(7.4)	(16.6)	(28.3)	(400.0)
4. Nodal Development	14,140	0.4	5.1	10.5	17.7	248.5
5 Bridge with Kabata Densities	23,270	0.6	6.6	18.6	28.6	406.5
6. Low Density North Su Valley	(62,765)	(2.8)	(20.2)	(50.2)	(87.3)	(1,179.9)

While these quantitative results are for education spending, it is likely that similar fiscal effects would be generated by a more detailed analysis of local road construction, which has historically been highly dependent on state funding. A $500 million Capital Improvement Project (CIP) list was recently approved based largely on the needs of the *current* MSB population, and a ten-year need of $1 billion has been asserted in the borough's economic development plan. In addition, the alternative land use scenarios that result in lower population would also likely generate more ecosystem services from undeveloped lands. These ecosystem services might in turn boost existing property values – a positive "price effect" that is not captured by the model.

Overall, this analysis shows that land use policies which moderate population growth could have significant positive long-run fiscal effects on the MSB if state support for schools and roads declines. These policies could be part of a sound overall fiscal strategy for the borough in the coming decades.

1. Introduction

The purpose of this analysis is to estimate the fiscal impacts on the Matanuska-Susitna Borough (MSB) and its taxpayers, through year 2050, of six different land use scenarios. The different land use scenarios result in significant differences in population by 2050. Higher population could be costly to local residents because the State of Alaska (SOA) currently pays much of the cost of education, roads, and public safety. With Alaska oil production declining,[4] these state contributions are likely to decline, leaving the MSB potentially facing a high incremental net cost to serve additional residents.

The analysis uses a quantitative fiscal model that estimates the cost of public services as a function of increased population. The model has been applied to six specific future land use scenarios developed for this study (Bingham 2012). The focus of the model is on education spending, due to the overwhelming importance of school expenditures in overall borough finances.

1.1 Conceptual issues

There are two fundamentally different ways that land use can have important fiscal effects on a borough. These are: 1) different numbers of people; and 2) different settlement patterns for a given population.

Different numbers of people

More people could have a positive fiscal impact on a region like the MSB if the incremental revenues stemming from an additional resident exceed the incremental costs. This outcome could occur if many costs are fixed and there is spare infrastructure capacity. For example, a road and utility network may exist in a semi-rural area where most of the property has not yet been subdivided into house lots. As subdivisions are developed, there are more people to pay the fixed costs of operations and maintenance, at least up to the point where intolerable congestion sets in. Positive fiscal effects could also result if the increase in residents causes a greater relative increase in the commercial and industrial property tax base than the relative increase caused in the residential property tax base.

[4] The Alaska Department of Revenue, in its *Fall 2013 Revenue Sources Book,* projects a 38% decline in North Slope oil production from 508,207 barrels per day in 2014 to 312,900 bpd in 2023. http://www.tax.alaska.gov/programs/documentviewer/viewer.aspx?1022r

More people could have a negative fiscal impact if incremental costs to MSB taxpayers exceed incremental revenues. This outcome could occur for two main reasons.

The first reason is overall diseconomies of scale – the incremental total cost (regardless of who funds it) of serving an additional household could be higher than the overall average cost of serving the existing population. Examples include:

- Congestion – A need arises for stoplights and sidewalks that were never previously needed.
- New infrastructure costs more due to expansion into areas with less favorable soil, slope, or other physical conditions.
- New infrastructure costs more than existing "grandfathered" infrastructure due to, perhaps, more stringent earthquake requirements.

The second reason that more people could have negative fiscal effects is that the increased cost to MSB taxpayers of serving each new household could exceed the increased tax revenue generated by that household:

- Business saturation effect - The nonresidential property tax base and/or tourism and bed taxes do not keep up with the population, so that total local tax revenue per resident declines under constant mill rates.
- Fiscal gap effect - Each household and student causes State of Alaska funding to flow in, but that state revenue does not cover the gap between additional property taxes and the additional cost of services, particularly education.

Different settlement patterns for a given population

The literature on settlement patterns and infrastructure costs has been compiled and summarized by Bingham (2012). The general conclusion of that literature is that nodal development – the concentration of people and infrastructure in smaller areas near public transit and transportation corridors -- can save about 25% of the cost of roads, school construction, and utilities for a given population. This estimate is used to evaluate one land use scenario below, but a much more detailed and spatially explicit engineering cost model would be needed to make more specific conclusions about the effect of specific development patterns on infrastructure costs.

The "replication test"

Another potentially useful way to think about the fiscal impacts of more people is to think about simply replicating the existing situation. If the number of people doubles, then one might think that MSB ought to be able to double its property tax revenues, double its state education funding, and double its federal and state highway money. While this logic is appealing, it may not always hold true. It could break down if business does not grow as fast as population; if the total cost of services increases due to diseconomies of

scale; if future state and federal funding per person is less than past amounts; or if there is an existing fiscal gap between incremental cost and incremental revenue. As noted above, the fiscal gap would occur if each household and student causes State of Alaska funding to flow in, but that state revenue does not cover the difference between additional property taxes and the additional cost of services, particularly education.

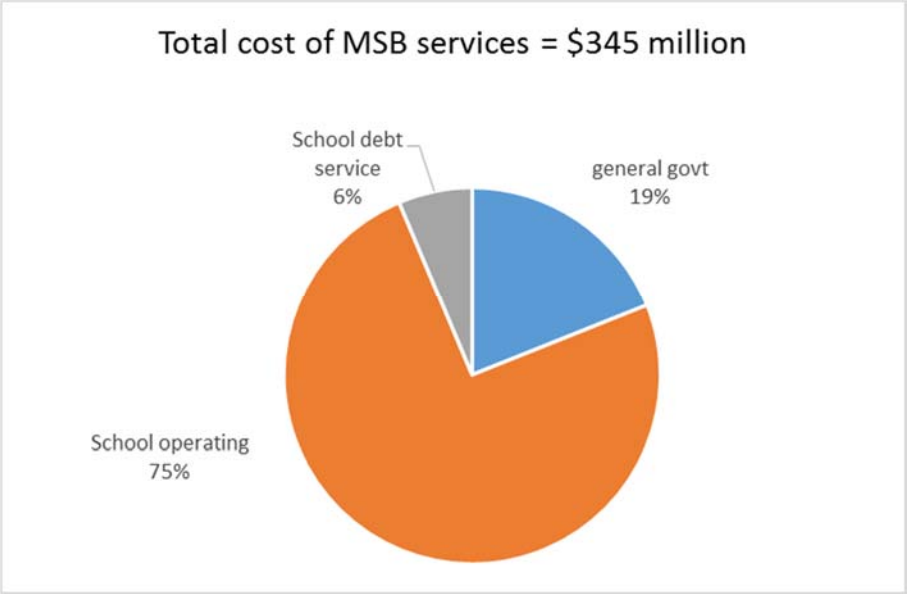
2. Current MSB fiscal situation and emerging challenges

The following background information sets the stage for the subsequent fiscal analysis by highlighting several salient aspects of the MSB fiscal and demographic situation that could change rapidly during the next 30 years.

2.1 Overall spending and revenues

The total cost of services provided to MSB residents in fiscal year 2012 was $345 million (Figure 1). Education - both operating costs and school buildings debt service[5] - accounted for 81% of this total, or $280 million. Figure 2 shows the sources of funds used to pay these costs. Local taxes totaled about $110 million (30%), while the state provided about $208 million (59%), primarily for education.[6] Federal support and non-tax revenues (such as charges for services) make up the balance of revenue.

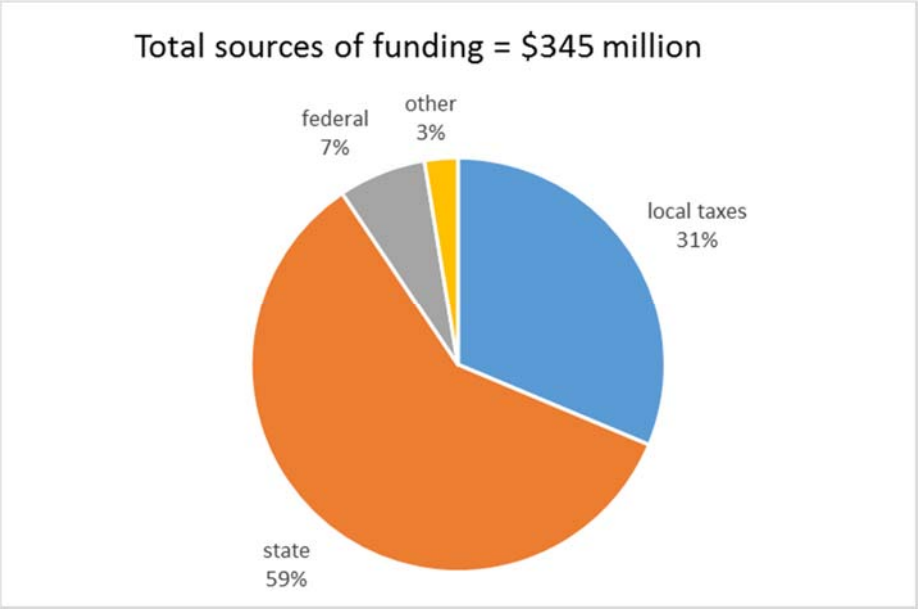
Figure 1. Total cost of MSB services, 2012



[5] Debt service is the repayment of principal and interest on bonds used to fund school construction.

[6] Unless otherwise noted, financial data are from MSB Comprehensive Annual Financial Reports (CAFRs). The numbers for this consolidated overview are from MSB 2013 Series A General Obligation School Bonds Official Statement. http://emma.msrb.org/ER658230-ER510603-ER913306.pdf.

Figure 2. Total sources of funding for MSB services, 2012



2.2 Education

Expenses per student

Table 1 and Figures 3 and 4 show trends from 2003 to 2012 in education expenses, expressed in real 2012 dollars per student. Major cash contributions by the state to the employee retirement systems (PERS and TRS)[7] are removed from the data since these monies are a "pass-through" that began in 2008. Capital outlays are also removed and debt service on school buildings is included as an education expense.[8] Debt service is the repayment of principal and interest on bonds used to fund school construction.

[7] The Public Employees Retirement System (PERS) covers non-certificated school staff and most other borough employees. The Teachers Retirement System (TRS) covers certificated teaching staff.

[8] Reported school expenses jumped by more than ten percent beginning in 2008 when the State began requiring large catch-up contributions to the Teachers Retirement System and Public Employees Retirement System (TRS and PERS) defined benefit plans. The State also provided funding of about $30 million per year to make most of the additional payments. Capital outlays are removed because they are effectively a double-counting of debt service, and in any case the amounts are minor. Debt service on school buildings is recorded as an expense within the MSB general government books, but does not show up on the MSB School District books. The borough owns the school buildings and provides them to the district for school use.

Table 1. MSB Education expenditures and major revenue sources 2003-2012
(real 2012 dollars per student)[9]

Expenditures	2003	2004	2006	2008	2010	2011	2012	avg growth
Total expenses	**12,916**	**12,047**	**13,081**	**13,147**	**13,943**	**14,399**	**14,054**	**1.6%**
Instruction	6,165	5,915	6,666	6,652	7,086	7,185	6,853	1.9%
Everything else	6,751	6,132	6,415	6,495	6,857	7,214	7,201	1.4%
Support	2,028	1,690	1,452	1,575	1,644	1,891	1,699	-0.4%
Administration	1,187	1,187	1,491	1,315	1,476	1,638	1,510	3.6%
O&M	1,268	1,157	1,233	1,207	1,335	1,242	1,400	1.1%
Transportation	854	764	705	702	752	753	810	-0.4%
Other operating	479	469	501	559	547	582	566	2.4%
Debt Service	936	864	1,033	1,137	1,103	1,109	1,216	3.3%

Revenues	2003	2004	2006	2008	2010	2011	2012	avg growth
Total major revenue sources	**12,579**	**11,944**	**12,810**	**13,089**	**13,721**	**14,599**	**14,166**	**2.0%**
State operating support: total	7,541	7,167	7,743	8,157	8,593	8,773	9,040	2.4%
State foundation formula	6,611	6,271	6,926	6,850	7,823	8,015	8,024	2.8%
State one-time appropriations	-	-	-	543	27	27	163	
State pupil transportation & other	930	896	817	764	743	731	853	-1.8%
Borough operating support	2,832	2,720	2,864	2,816	2,786	2,898	2,771	0.3%
Federal support	1,271	1,193	1,170	980	1,239	1,819	1,138	2.3%
Borough & state debt svc payments	936	864	1,033	1,137	1,103	1,109	1,216	3.3%

note: average annual growth rates computed from (average(2003,2004)) to (average(2011, 2012))

Total expenses per student increased by 1.6% per year.[10] The increase has been driven by both instructional and non-instructional costs, which increased at 1.9% per year and 1.4% per year, respectively. Debt service on buildings grew at 3.3% per year.

[9] Data for Table 1 and for numbers of students are from MSB School District FY12 CAFR, statistical section.

[10] Using a 2-year moving average, hence comparing the average of 2003-2004 with the average of 2011-2012.

Figure 3. Instruction and non-instruction expenses
(real year 2012 dollars per student)

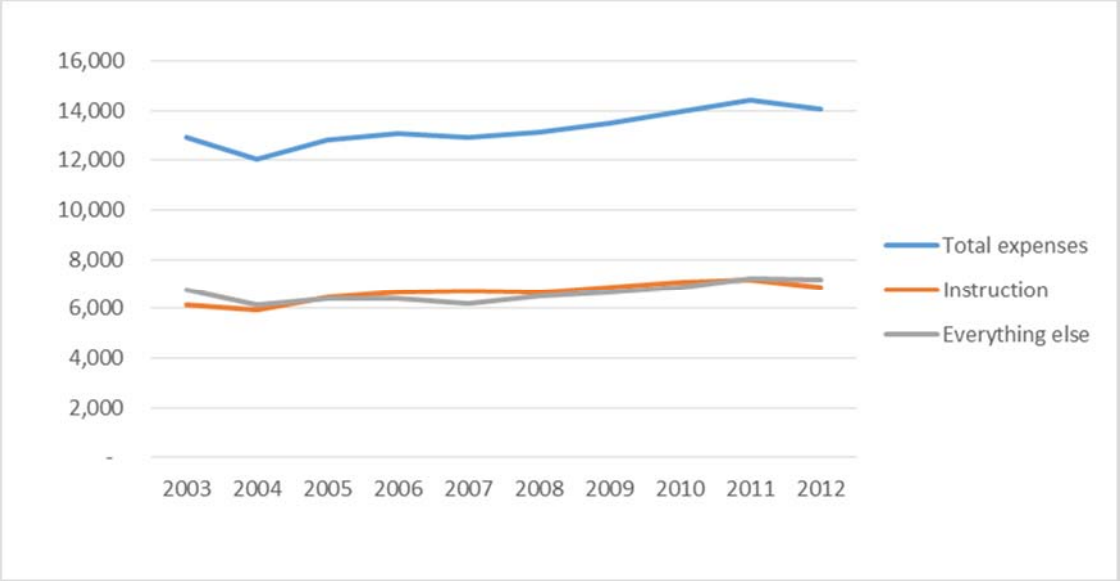
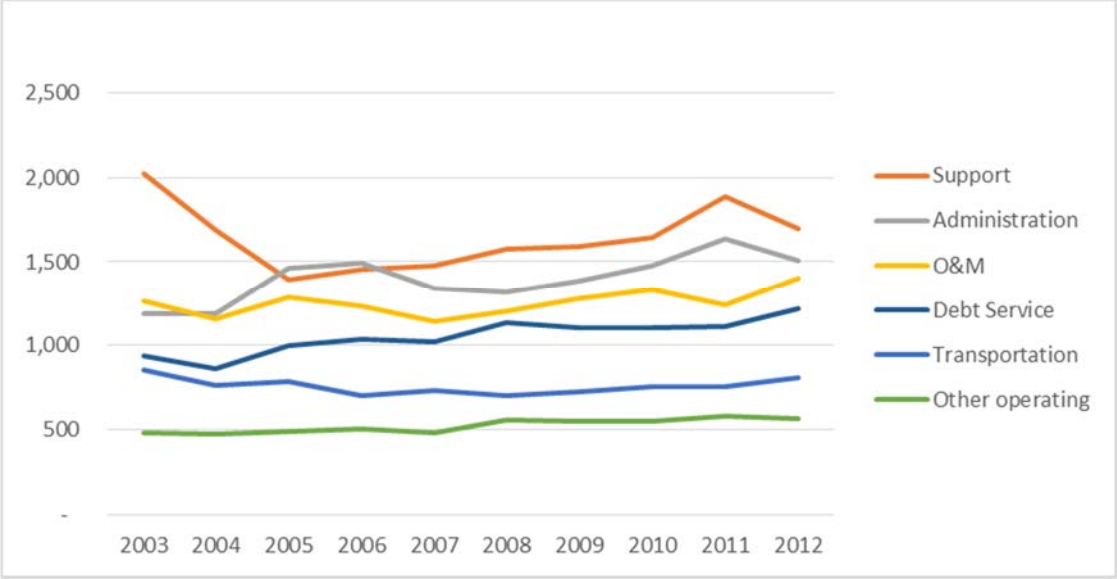
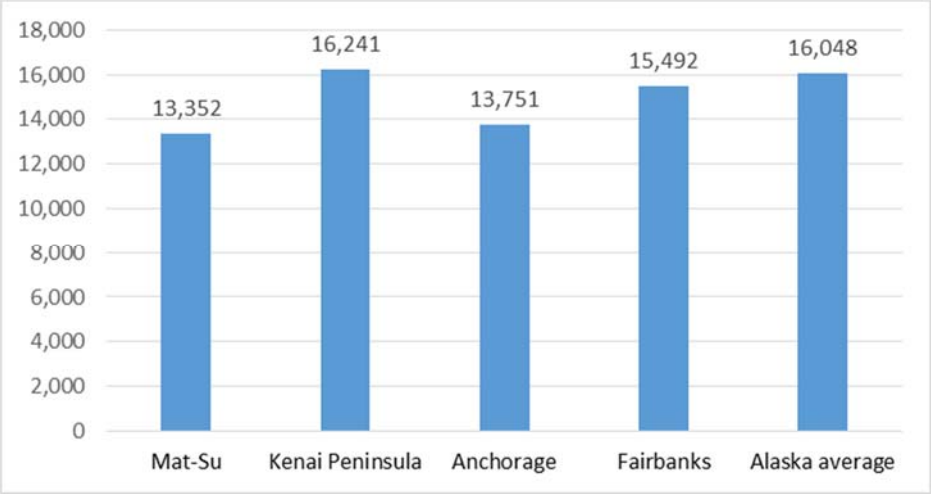


Figure 4. Education expenses other than instruction
(real year 2012 dollars per student)



Although total MSB expenses per student have been growing, it's important to keep in mind that in 2013 the MSB had the lowest "audited operating expenses" per student among all major Alaska school districts.[11] Figure 5 shows some of the most relevant comparisons.

Figure 5. FY 2013 "Audited operating expenses" for education
(dollars per student)



Revenues per student

Figure 6 shows the trends in real education revenues per student (see also Table 1, above). Total state support -- from the combination of the so-called "foundation formula,"[12] pupil transportation funding, and several one-time appropriations since 2010 -- increased at 2.4% per year. Operating support from the borough has been essentially constant.

The State of Alaska school foundation formula determines "basic need" as the "base student allocation" (BSA) multiplied by the "adjusted average daily membership"

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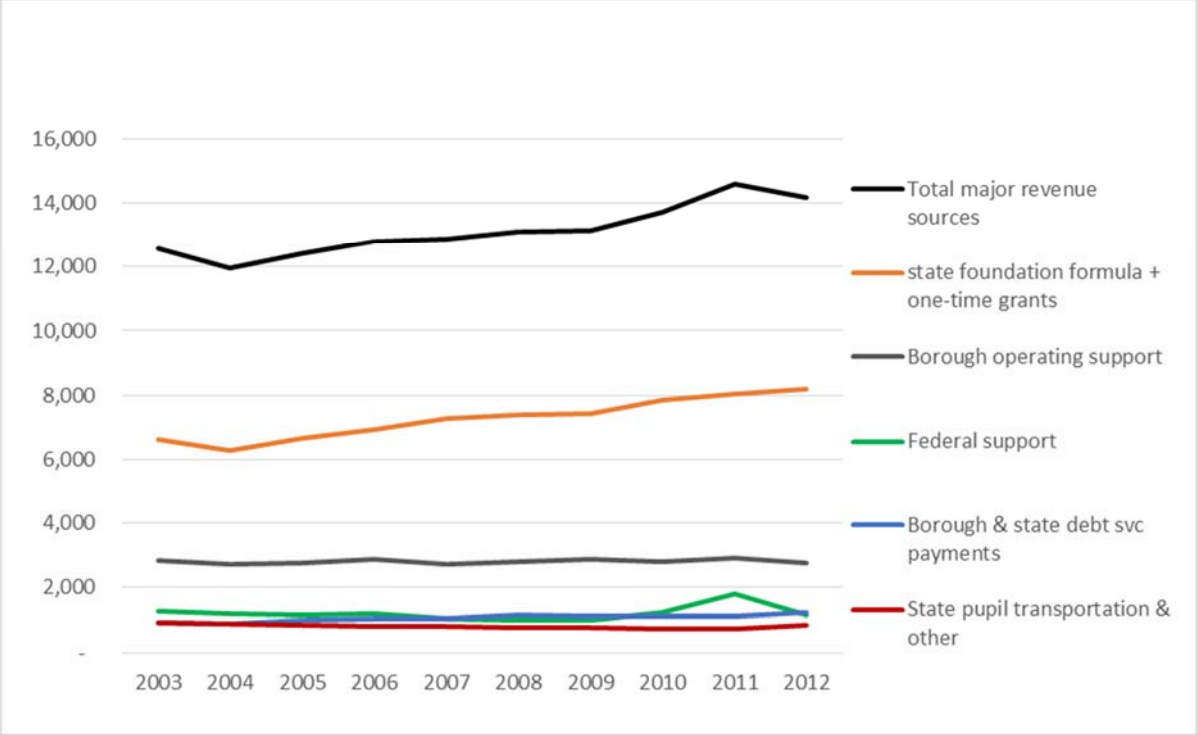
[11] State of Alaska Department of Education and Early Development. "District Profiles" worksheet. http://education.alaska.gov/reportcard/2012-2013/RC13_District_Profiles_Table.xlsx. Only 7 of 53 total districts had lower audited expenses per student and this group includes several with high numbers of correspondence students.

[12] Alaska Statute 14.17.410.
http://www.touchngo.com/lglcntr/akstats/statutes/title14/chapter17/section410.htm

(AADM) for the district. The AADM exceeds the actual number of students, so recent foundation funding per actual student (Figure 6) exceeds the BSA amount of $5,680. [13]

The base student allocation has remained constant since 2010 at $5,680 per "adjusted" student.[14] While the legislature has from time to time increased the BSA and/or provided one-time additional funds (such as 2.4 million for "energy cost relief" in 2012), the foundation formula itself contains no inflation adjustment or other provision for further change to the BSA. Therefore the trend during the past decade in foundation funding per student -- +2.8% per year in real 2012 dollars -- may not be indicative of future increases.

Figure 6. Major education revenue sources
(real 2012 dollars per student)



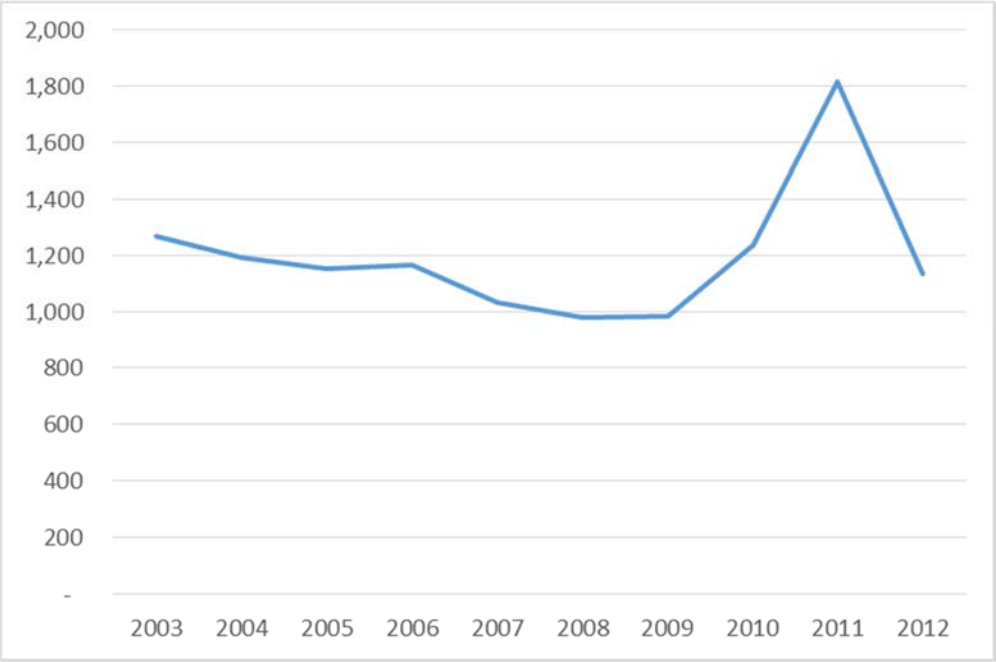
[13] The trend line in Figure 6 for foundation funding per student also includes several one-time items, which yield a further difference foundation funding per student and the BSA amount. State education funding formulas are complex. A good overview is provided by the Department of Education and Early Development in the 2013 version of its "Public School Funding Program Overview": http://education.alaska.gov/news/pdf/FundingProgramOverview2014.pdf

[14] Legislation being considered in conference committee, but not passed as of April 24, 2014, would increase the BSA by $150 in FY2015, and by $50 in 2016 and 2017. http://www.adn.com/2014/04/23/3438984/compromise-announced-on-education.html

Federal education funding

With the exception of stimulus spending during FY2010-2012, total federal funding has been declining in real dollars per student, as shown in Figure 7.

Figure 7. Federal education funding
(real 2012 dollars per student)



Summary of education fiscal situation

While one might hope that education expenditures *per student* would decline during a period of rapid enrollment growth – due to economies of scale – this has not been the trend for the MSB. Instead, real dollar expenditures per student have been slowly increasing, while state and federal support has been flat or declining.

2.3 MSB non-school revenues and expenditures

Local government revenues

Table 2 and Figure 8 show local government revenues expressed in real 2012 dollars per capita. Local government revenues include all local taxes and state and federal funds other than for education or school debt service reimbursement. Total taxes per capita grew faster (2.7% per year) than property taxes (2.1%) partly due to the addition of an excise tax on tobacco in 2006. Property taxes per capita increased, perhaps due to more nonresidential property per capita or to rising house prices. Taxable assessed value in real 2012 dollars per capita grew rapidly from 2005 to 2007, flattened out during the 2008-2010 recession years and then declined slightly (Figure 9). Total taxes do not necessarily track assessed value because the mill rate is adjusted each year based partly on changes in assessed value.

Table 2. Local revenues and non-school expenditures
(real 2012 dollars per capita)

Revenues	**2003**	**2004**	**2006**	**2008**	**2010**	**2011**	**2012**	**avg growth**
Total taxes	982	989	1,261	1,258	1,311	1,262	1,171	2.7%
Property taxes	969	976	1,181	1,185	1,238	1,199	1,106	2.1%
Federal & state (net of school DS reimb)	200	207	124	298	311	492	453	11.1%
Charges for services & other	195	186	183	200	83	77	68	-11.3%
Total local govt revenue	**1,376**	**1,382**	**1,569**	**1,756**	**1,705**	**1,831**	**1,692**	3.1%
Non-school expenditures	**2003**	**2004**	**2006**	**2008**	**2010**	**2011**	**2012**	**avg growth**
General Government	163	190	192	227	251	219	212	2.5%
Public Works	36	35	38	41	46	40	45	2.3%
Emergency Services	104	137	177	197	182	184	193	5.8%
Public Services	180	270	198	264	216	207	232	-0.3%
Debt service other than schools	21	22	13	12	17	20	24	0.1%
Total non-school expenditures (excludes capital outlays)	**503**	**654**	**618**	**741**	**711**	**670**	**705**	2.2%
MSB support for education								
Operating support to schools	567	574	570	547	523	541	546	-0.6%
Local payment of school debt svc	65	61	68	73	72	72	83	2.6%
Total local support for education	**632**	**635**	**638**	**620**	**595**	**613**	**628**	-0.3%

Note to table: federal and state revenues include capital grants, so this table does not give a completely accurate picture of "operating" revenues and expenses.

Figure 8. Local government revenues
(real 2012 dollars per capita)

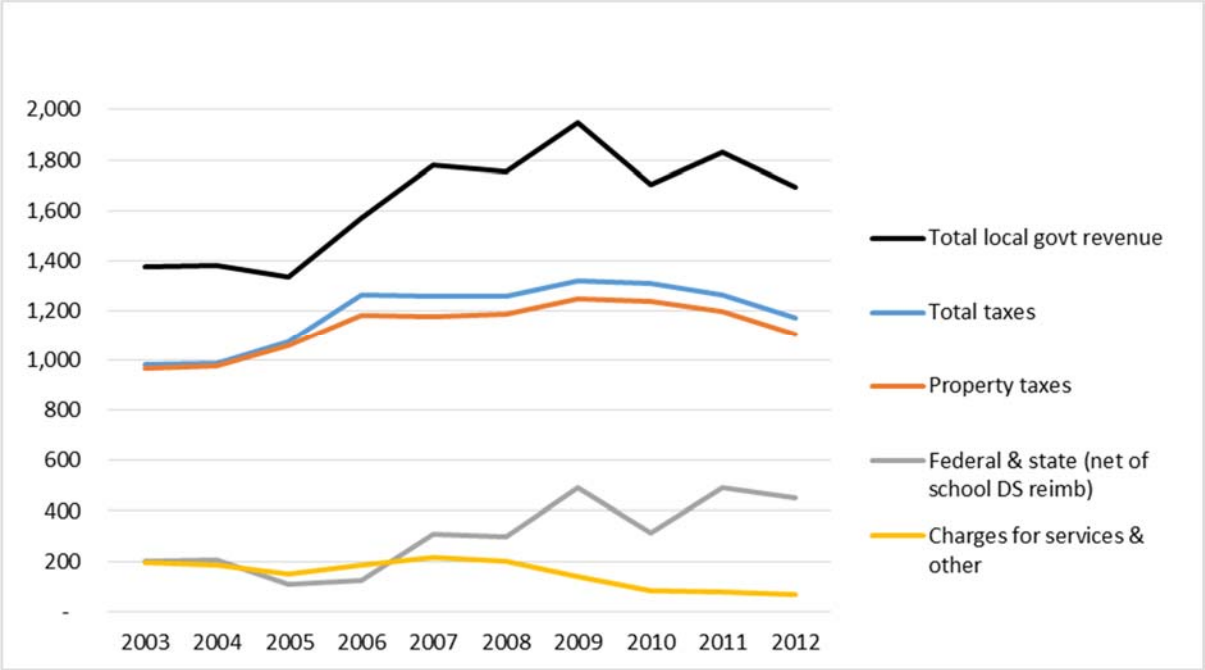
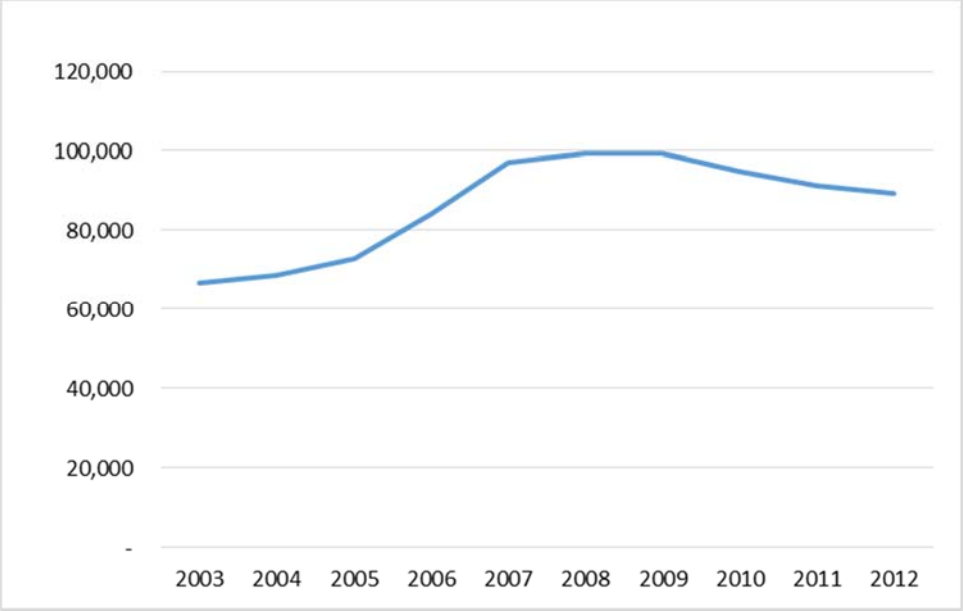


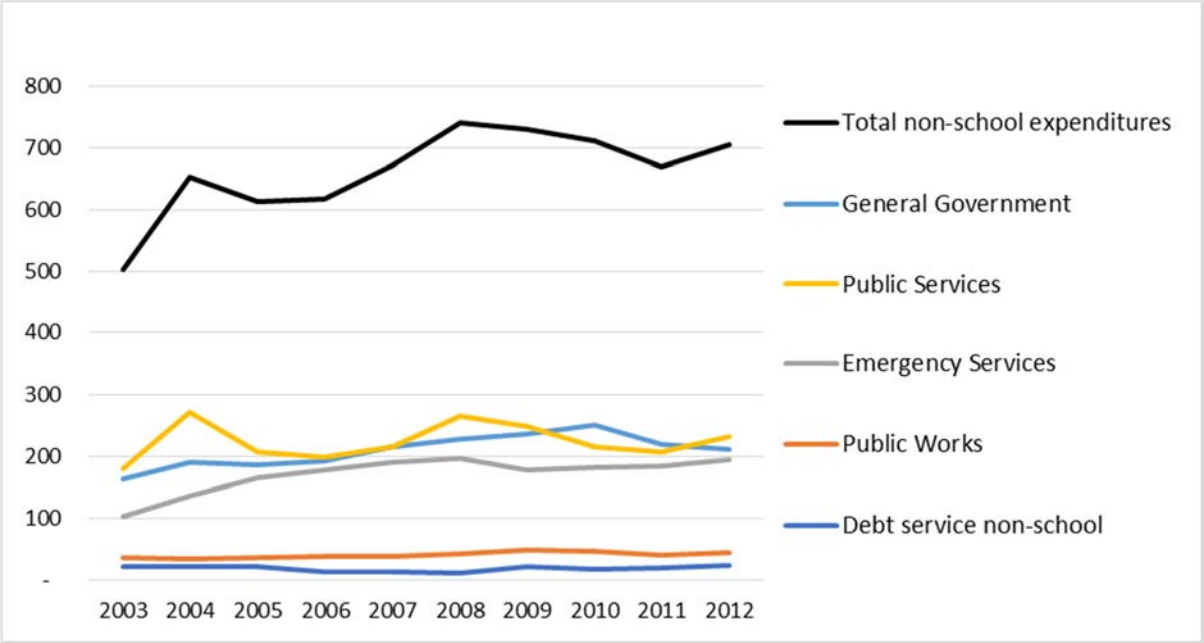
Figure 9. Taxable assessed property value, as of January 1
(real 2012 dollars per capita)



Non-school expenditures

Figure 10 shows local government expenditures excluding schools (see also Table 2, above). This total includes operating expenses and a small amount of debt service for roads and public facilities. While total non-school spending increased from 2003 to 2008, it has been flat or declining since then.

Figure 10. Local government non-school expenditures
(real 2012 dollars per capita)



2.4 Roads and other infrastructure

Judging from the available evidence provided by MSB bond issues during the last decade, road construction in the borough appears to have been historically paid for largely with state and federal funding.

In 2011 the MSB issued $12 million in bonds for roads and voters approved an additional $16.2 million in school access transportation bonds. The latter bonds are strictly contingent on obtaining an additional $16.2 million of state match. The amounts of these two bond issues suggest that only a small fraction of total road construction needs are currently being funded by local sources. (Road service areas collect property taxes and pay for road *maintenance*). Many larger projects are listed in current capital

improvement plans. For example, the FY2015-2020 CIP document[15] identifies more than $500 million of road project priorities. This five-year list of road improvements equates to about $17,000 per household. Also, a ten-year need of $1 billion has been asserted in the borough's economic development plan (TIP Strategies 2010).

Analysis of bond issues since 2000 also shows little or zero past or current bonding for the capital cost of other infrastructure such as fire stations, ambulances, sports facilities, or administrative buildings. Presumably most of this infrastructure has been paid for in the past with state capital project funds. In any case there is very little MSB taxpayer money currently being spent on such projects.

2.5 Emerging fiscal challenges

Dependence on state education funding

As discussed above, more than 80% of total MSB spending is for education. In 2012 the State of Alaska (SOA) provided about 71% of total education funding ($200 million).[16]

The MSB "local contribution" per student to school funding has been flat or declining when adjusted for inflation, and is considerably less than the local contributions in Anchorage, Kenai, or Juneau (Figure 11). Thus, state funding plays a relatively greater role for MSB schools than for schools in these other regions.

The SOA base student allocation amount has not been adjusted for inflation at least since 2011. Other one-time funding infusions have helped districts keep up with inflation. A recent MSB School District budget projection assumes that one-time funds will not continue and that the BSA amount will remain constant in nominal dollars, thus eroding in real terms. The resulting projections by the District show a "structural deficit" that grows to $14 million by FY2017. [17]

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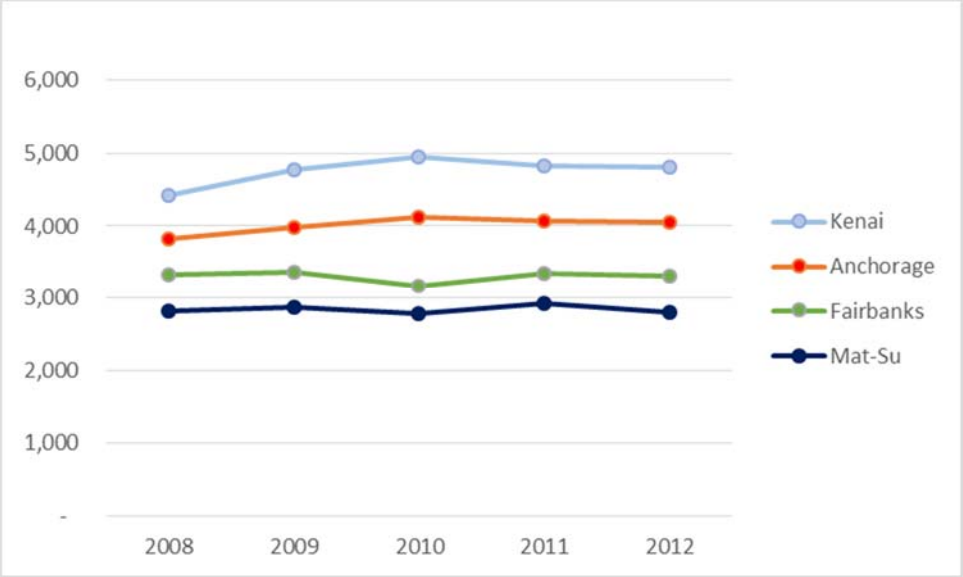
[15] http://www.matsugov.us/docman/doc_download/114344-2015-2020-cip-final

[16] The definition of total spending is the "governmental funds" basis. See e.g. MSB Comprehensive Annual Financial Report FY2012, pp 20-21.

[17] MSBSD Presentation: "Senate Finance DEED Subcommittee Cost Drivers in K-12 Education August 21, 2013" http://www.matsuk12.us/cms/lib/AK01000953/Centricity/Domain/92/Senate%20Finance%20DEED%20Subcommittee%20FINAL%2020130821.pdf

Figure 11. Local contributions to education, 2008 – 2012
(real 2012 dollars per student)



School pupil transportation

The state's pupil transportation reimbursement is a fixed amount per student, with no consideration for distances covered. The per-student amount was increased by statute from $910 in 2012 to $939 in 2013. Further increases based on the Anchorage consumer price index are included in current law (SB57), but only through FY2016.[18]

School debt service

Current debt service per student is only about $1,200 but projected future debt service could be much higher. For example, the new Joe Redington Middle School / High School is estimated to cost $65.5 million and serve 550 students with 94,050 square feet.[19] The total construction cost equates to $119,091 per student, which could create a debt service obligation of $8,005 per year per additional student served. Table 3 shows how debt service for a mix of new elementary and secondary schools could exceed $6,000 per year per additional student served.

[18] http://legiscan.com/AK/text/SB57/2013

[19] www.matsugov.us/cpd/purchasing/doc_download/5254-msb-knik-school-cmgc-rfp

Table 3. Example of debt service burden from new schools

Project	Cost $ million	Students	$ per student served	Debt svc per student served
Redington MS/HS	65.5	550	119,091	8,005
Knik Elementary	26.5	400	66,250	4,453
Average			92,670	6,229

Note: assumes 20-yr repayment of bonds at 3.0% interest

The potential incremental debt service per student served greatly exceeds the current average for three reasons. First, many of the larger schools are more than 20 years old and have therefore been paid off if 20-year debt was used. Second, some of the large schools may have been constructed with state grants during the 1980s, when the state had lots of oil revenue. Finally, some of the new schools are replacing portable classrooms that were deployed to handle increasing numbers of students. In other words, the MSB can be said to be catching up with past growth. As long as growth in number of students is high enough, the need for new construction and new debt service will exceed the effect of paying off older facilities. There may also be replacement or major maintenance requirements for schools 30-50 years old.

The State of Alaska currently reimburses local school districts for 70% of school construction debt. According to the Alaska Department of Education and Early Development (DEED), MSB school projects account for 57% of the total statewide amount of reimbursable school debt approved between July 1, 2010 and December 31, 2012.[20] Any district can apply for debt service reimbursement and all requests conforming to program guidelines have historically been funded. However, all reimbursement funding is subject to annual legislative appropriations.

This analysis suggests that increasing debt service for new schools could become a source of fiscal drag (expenses for each new student exceed revenues), especially if the SOA reimbursement percentage drops. Tracking school debt is one of the key functions of the fiscal model discussed below.

Retirement system payments

The State of Alaska is currently paying about $28 million per year in “catch-up” payments on behalf of the borough to the underfunded TRS and PERS defined benefit pension plans. These plans cover MSB retirees and some active employees. New

[20] DEED. 2013 report to Alaska Legislature on SB 37, (pp. 5-6)

teachers and public employees would not add to the burden of the TRS and PERS underfunding because the defined benefit plans were eliminated in 2006.

Roads

As noted above there is a current road needs list of more than $500 million. It is unclear to what extent the federal government and especially the State of Alaska will be able to continue road funding at historical rates established during the oil boom.

One example of this challenge is the Knik Goose Bay Road Transportation Safety Corridor project. The total cost for upgrading 6.8 miles of road to 4 lanes is $108 million. Of this amount, $10 million was provided by the state in the FY2013 capital budget, leaving the remaining $98 million listed in the state's STIP needs list as "proposed state funding."[21] This road did get moved into the National Highway System network as part of the federal 2012 transportation bill, so it is now presumably eligible for federal funding.

Another way of viewing the roads challenge is to consider the FY2013 – FY2015 state capital budgets. At $1.9 billion of state general funds,[22] the FY13 capital budget was the largest capital budget in a long while and is unlikely to be repeated. The FY2014 capital budget is $1.3 billion and the governor's proposed FY15 capital budget is $0.4 billion.[23] Of the $1.3 billion FY2013 amount, only about $60 million in state funds came to the MSB for roads and $32 million of this was to match two local bond issues. There was also about $22 million in federal highway funds, of which almost all was applied to the overall $74 million cost of the 16-mile Glenn Highway upgrade from mile 34 to mile 50.

One way of summarizing the funding situation for roads might be to conclude that federal funding and associated state matching is likely to be barely sufficient to keep the major state highways in the area (e.g., Parks Highway, Glenn Highway) in good repair and fully functional.

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[21] SOA STIP needs list project 23616.
http://www.dot.state.ak.us/stwdplng/cip/stip/stiptool_future/reporter_amd_int.cfm?form.txtpnid=23616

[22] With federal funds included, the total capital budget amount was 2.8 billion.
http://omb.alaska.gov/ombfiles/13_budget/PDFs/FY2013_Enacted_Less_Vetoes_Fiscal_Summary.pdf

[23] Governor's FY15 budget fiscal summary. January 2014.
https://omb.alaska.gov/ombfiles/15_budget/PDFs/FY2015_Governor_Fiscal_Summary_12.12.13.pdf

Population growth

The MSB population increased by almost 60% between 2000 and 2012, from about 60,000 to about 94,000. During this period Anchorage and the rest of the state grew by only 15% and 11% respectively.[24]

The MSB average annual population growth rate has dropped from 4.8% per year in the first half of the 2000s to 3.3% in the second half of the decade, but that growth rate is still more than 3 times the Anchorage rate. If recent growth rates continue, MSB population could grow to almost 300,000 people by 2050, and the Borough share of total Alaska population could double to 30%, from 15% today.

The discussion above suggests that there are several potential ways in which continued rapid population growth could be a fiscal challenge. First, the data show that total school operating expenditures per student are increasing. Second, a significant increase in debt service per student is likely. Third, inflation-adjusted state foundation funding per student is likely to decline as total state revenues fall while the total student population rises. Fourth, state reimbursement of school debt is subject to annual appropriations and could be subject to cuts affecting new construction or even buildings that had already been built. Fifth, road construction appears to be heavily dependent on state and federal funding sources that may not respond easily to increased population.

An underlying fact is that MSB population could grow to 30% of total Alaska population. If so, MSB decisions that affect the total number people and students and the total cost of its own roads and schools would have a significant feedback effect, as 30 cents of every additional “state dollar” would be effectively coming from MSB citizens.

[24] Alaska Department of Labor and Workforce Development. http://laborstats.alaska.gov/pop/popest.htm.

3. Fiscal impacts of alternative land use scenarios

This section considers the fiscal effects of a base case scenario and six alternative future land use scenarios developed by Shannon Bingham of Western Demographics (Bingham 2012).

3.1 The model

The fiscal model developed for this analysis projects MSB expenditures, local revenues, and State of Alaska funding, between 2013 and 2050. The model focuses on education spending due to its overwhelming importance to overall borough finances. The model projects students, school building needs, school debt service, and receipt of state school foundation dollars. A summary of model logic is provided in Appendix A.

The model does not extend to fire and road service areas. There are roughly 8 fire service areas, 16 road service areas, and at least 10 special purpose service areas, each with its own property tax scheme and mill rate. A complete accounting of fiscal impacts – especially for road maintenance and fire protection – would need to separately model each of these areas (and the political process of creating new ones). That level of detail is beyond the scope of this analysis.

3.2 Base case

In the base case, MSB population increases *toward* a final built-out limit of 398,322 that was determined by Bingham (2012) using GIS analysis. A future growth rate of 2% is assumed. With 2% annual growth the population level reached in 2050 is 199,074 – about one half the final built-out amount. A 2% growth rate is a reasonable estimate because it is lower than past rates but still higher than current rates for Anchorage or for the rest of Alaska.[25] MSB population growth will likely exceed growth in other urban centers such as Anchorage because the MSB has become, at least in part, the leading edge of the Anchorage / Mat-Su labor market region and there is little undeveloped land left in Anchorage (Szymoniak & Colt 2009). Appendix B provides further discussion of MSB demographic data and trends that support the assumption of 2% annual growth.

[25] see Appendix B for further data and discussion of demographic trends. Since the analysis of impacts depends on the *difference* in population between the base case and the alternatives, the choice of the base case population growth rate, by itself, is less important than it might seem.

Base case assumptions

The base case uses the following critical assumptions:

- MSB population growth rate equals 2.0% per year
- Number of students per capita remains constant at 0.185
- No further change in real per-student school operating expenses
- SOA school foundation funding remains constant measured as total (statewide) nominal dollars – does not adjust for inflation or growth in total students
- SOA school building debt reimbursement declines from 70% to 50% by 2050
- SOA pupil transportation reimbursement per student declines by 1% per year in real dollars – funding does not keep up with inflation
- Both total nonresidential property value and total residential property value grows with population, so that the total (residential plus nonresidential) taxable property value per capita remains constant and inflation-adjusted property taxes per capita remain constant.
- Total MSB bed tax and excise tax revenue grows by 2% per year in real dollars

The complete set of base case parameter values is shown in Appendix A.

Base case projections

Table 4 shows the base case projections and Figure 12 summarizes the key results. The population grows to almost 200,000 in year 2050. Due to flat total state funding for education and the increased debt service from new school construction, an annual funding shortfall develops of $217.7 million, or $1,093 per person (see bottom rows of table). The shortfall is the amount by which projected education expenditures exceed projected revenues for education from all sources.

Table 4 also shows the sales tax rate that would be required in order for a sales tax to generate enough revenue to cover the shortfall, assuming annual taxable sales of $6,500 per person – the current amount in the Kenai Peninsula Borough.[26] In the base case the required sales tax rate increases to 16.8% in 2050. A rate that high is clearly not a realistic possibility; rather, it illustrates the magnitude of the shortfall.

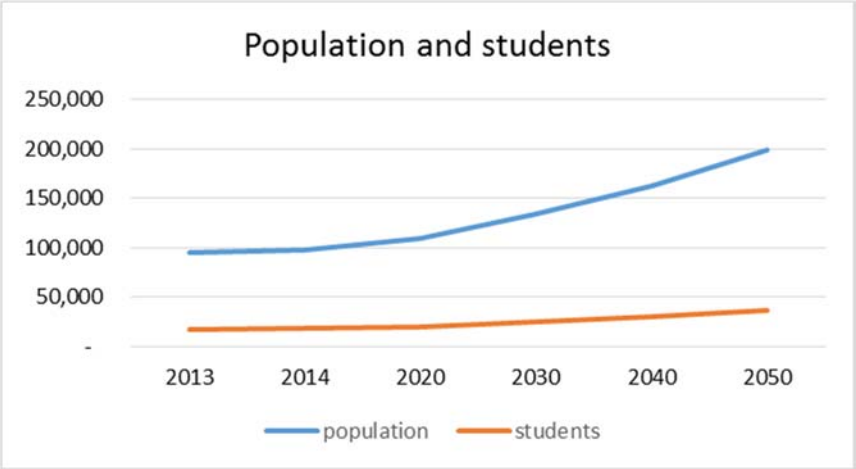
[26] Calculated from taxable sales data at: http://www.borough.kenai.ak.us/finance-dept/sales-tax/sales-tax-information and from KPB population estimates for 2012 and 2013 from Alaska DOLWD.

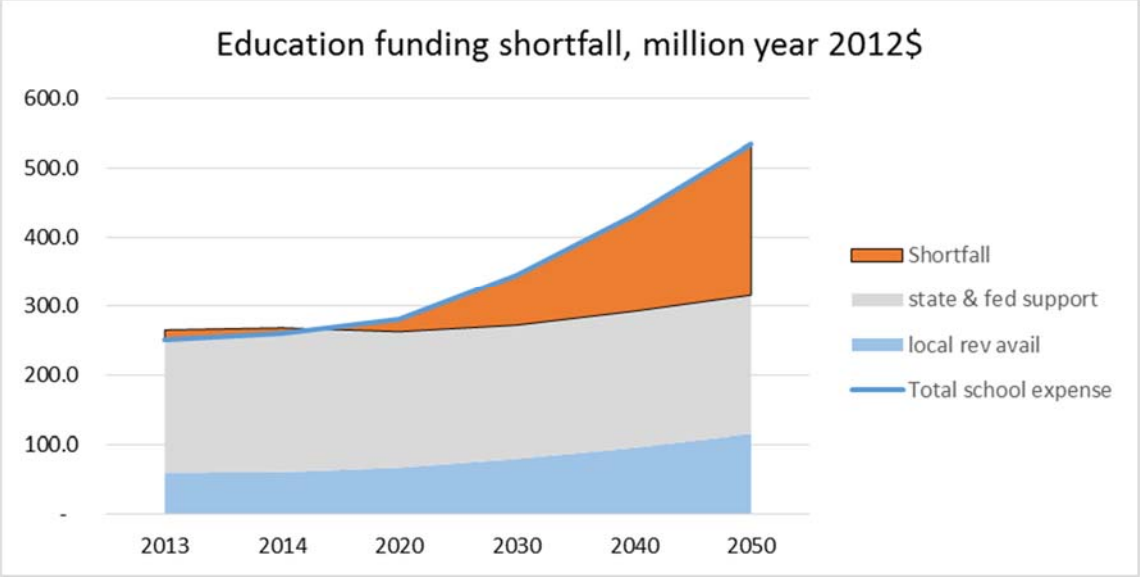
The base case projections are not a forecast. They simply provide a benchmark for estimating the impacts of the alternative land development scenarios presented in the sections that follow.

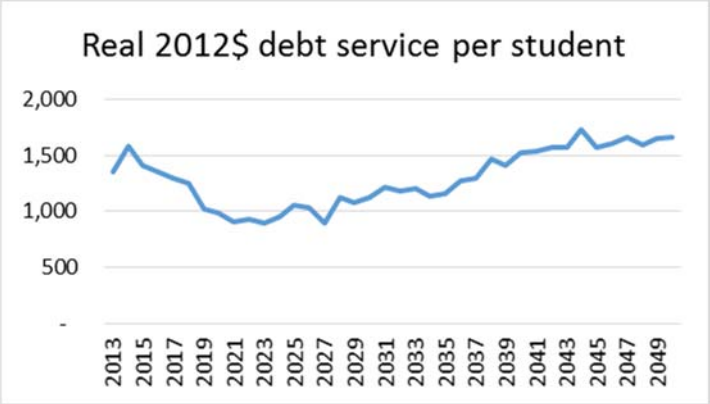
Table 4. Base case projections – 2% population growth

							change from 2013 to 2050	
	2013	**2014**	**2020**	**2030**	**2040**	**2050**	**absolute**	**%**
population	95,677	97,591	109,903	133,971	163,310	199,074	103,397	108%
students	17,685	18,038	20,314	24,763	30,186	36,796	19,112	108%
millions of real 2012 dollars:								
Local revenue								
taxes & fees	118.6	121.0	136.2	166.1	202.4	246.7	128.2	108%
fed and state non-school	9.4	9.4	9.1	9.0	9.3	9.9	0.4	5%
Total local revenue	**128.0**	**130.3**	**145.4**	**175.1**	**211.7**	**256.6**	128.6	100%
Local general govt expenses								
General Government	20.3	20.7	23.3	28.4	34.6	42.1	21.9	108%
Public Works	4.3	4.3	4.9	6.0	7.3	8.9	4.6	108%
Emergency Services	18.5	18.9	21.3	25.9	31.6	38.5	20.0	108%
Public Services	22.2	22.6	25.5	31.1	37.9	46.2	24.0	108%
Debt service other than schools	2.3	2.3	2.6	3.2	3.9	4.7	2.4	108%
Total local govt expense	**67.5**	**68.8**	**77.5**	**94.5**	**115.2**	**140.4**	72.9	108%
Local rev. avail. for schools	**60.5**	**61.5**	**67.8**	**80.6**	**96.5**	**116.2**	55.7	92%
Total school expenses								
instruction	121.2	123.6	139.2	169.7	206.9	252.2	131.0	108%
support and admin	56.7	57.9	65.2	79.5	96.9	118.1	61.3	108%
O&M of plant	24.8	25.3	28.4	34.7	42.3	51.5	26.8	108%
transportation	14.3	14.6	16.4	20.0	24.4	29.8	15.5	108%
other operating	10.0	10.2	11.5	14.0	17.1	20.8	10.8	108%
debt service	24.0	28.5	20.0	27.8	46.0	61.2	37.3	155%
Total school expenses	**251.0**	**260.1**	**280.8**	**345.7**	**433.6**	**533.6**	282.6	113%
less:								
State and federal support								
Federal	20.1	20.5	23.1	28.2	34.4	41.9	21.8	108%
State foundation	152.1	150.6	141.8	128.4	116.2	105.2	(46.8)	-31%
State pupil transportation	16.3	16.4	17.4	19.2	21.2	23.4	7.1	43%
State debt service	16.6	19.6	12.9	16.2	24.3	29.3	12.6	76%
Total state & fed support	**205.1**	**207.1**	**195.3**	**192.1**	**196.1**	**199.7**	(5.4)	-3%
equals:								
Required local support	**45.9**	**53.0**	**85.5**	**153.7**	**237.5**	**333.9**	288.0	627%
compare to available support at current tax rates:								
	60.5	61.5	62.5	63.5	64.6	65.6	66.7	
equals: **shortfall or (excess)**	**(14.6)**	**(8.5)**	**17.6**	**73.1**	**140.9**	**217.7**		
shortfall $ per capita	(153)	(87)	160	545	863	1,093		
required sales tax rate to cover shortfall			2.5%	8.4%	13.3%	16.8%		

Figure 12. Base case projections







3.3 Scenario 1: Higher density in the Western Knik Goose Bay Road corridor (Knik-Fairview) and Point MacKenzie area consistent with an area-wide water and sewer system.[27]

Currently in the Mat-Su Borough, only four municipal water and sewer systems exist. Large systems exist for Wasilla and Palmer. Smaller systems serve Settler's Bay and Talkeetna. The balance of the housing, commercial, and institutional structures throughout the area are served by domestic or small-scale well and septic systems.

Water quality is a frequent challenge in areas with widespread use of well and septic systems, such as the burgeoning Knik Goose Bay Road corridor. Knik-Fairview is unincorporated and with a 2010 population of 15,588 it could arguably be described as Alaska's fourth largest settlement. Currently there is no plan for future large-scale municipal water or sewer service. This scenario simulates the higher residential development density that would be possible if a large-scale domestic water and sewer system were installed to serve this area. Well and septic forces a low-density land use given leach field requirements and a municipal piped system would enable densities similar to those in Wasilla or Anchorage.

Scenario 1 results in 42,497 additional people; the increase is assumed to occur gradually between 2013 and 2050. To generate this outcome the annual population growth rate input to the model is increased to 2.52%.

3.4 Scenario 2: Significant farmland removed from development consideration

Some of the finest farm land in the State of Alaska is located in the Mat-Su Borough. Borough farmers provide much of the locally-grown food available in a state that imports the majority of its nourishment from the Lower-48 states. Farmland located south of Palmer, northwest of Palmer and in the Point MacKenzie area is also viewed as having prime residential development potential given its flatness and stable soil characteristics.

This scenario simulates the retention for agricultural use of borough land with high value farming characteristics. Population and dwelling unit growth on these parcels would be suspended. The designation of these areas would be based on documented soil categorization mapping which has been generated by respected government agencies.

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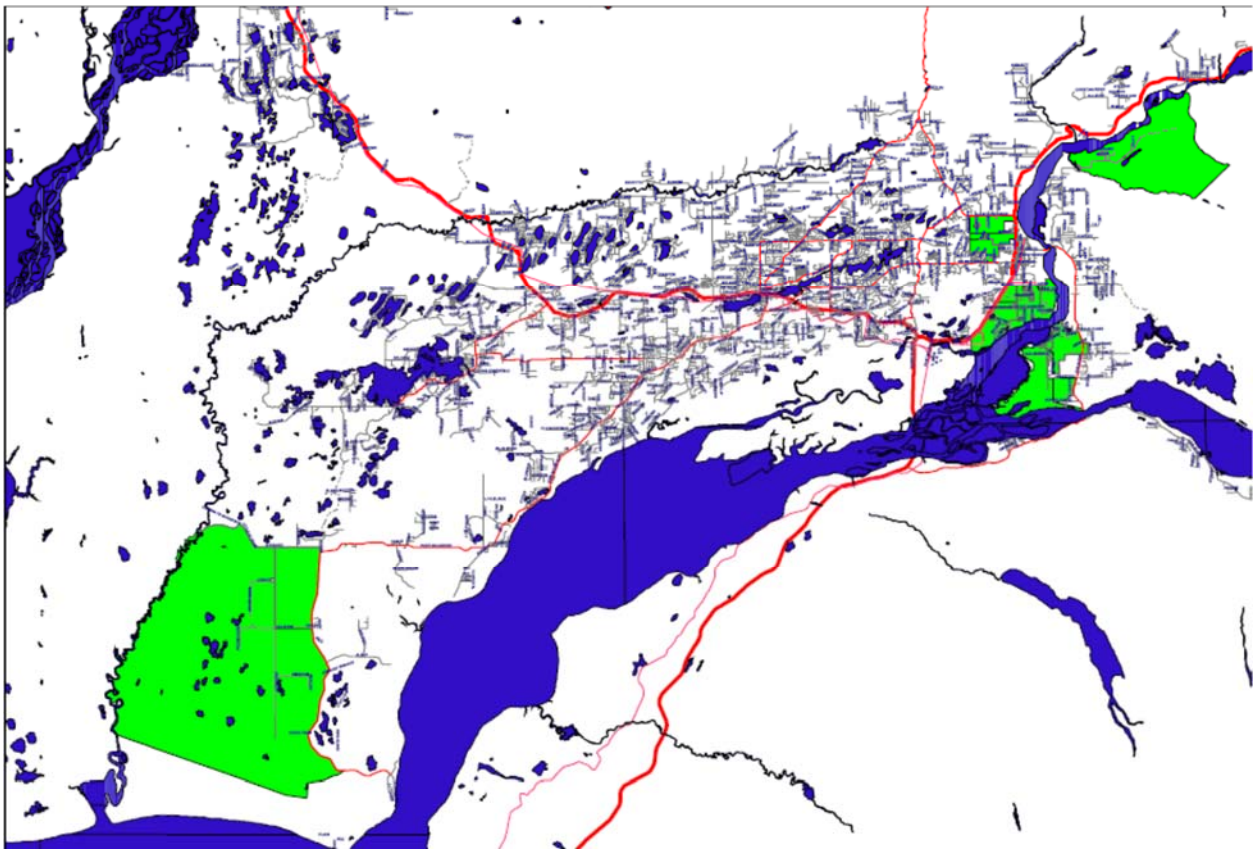
[27] The descriptions of all 6 alternative scenarios have been provided by Shannon Bingham of Western Demographics, Inc.

Under Scenario 2 a total of 19,431 acres of significant farmland south of Palmer, northwest of Palmer, and in the Point MacKenzie area would be set aside, as shown in green in Figure 13. This scenario results in 3,489 fewer people. To generate this outcome as of 2050 the annual population growth rate input to the model is reduced to 1.95%.

Figure 13. Significant farmland areas for Scenario 2



3.5 Scenario 3 - Significant natural, aquifer infusion and wetland areas removed from development consideration

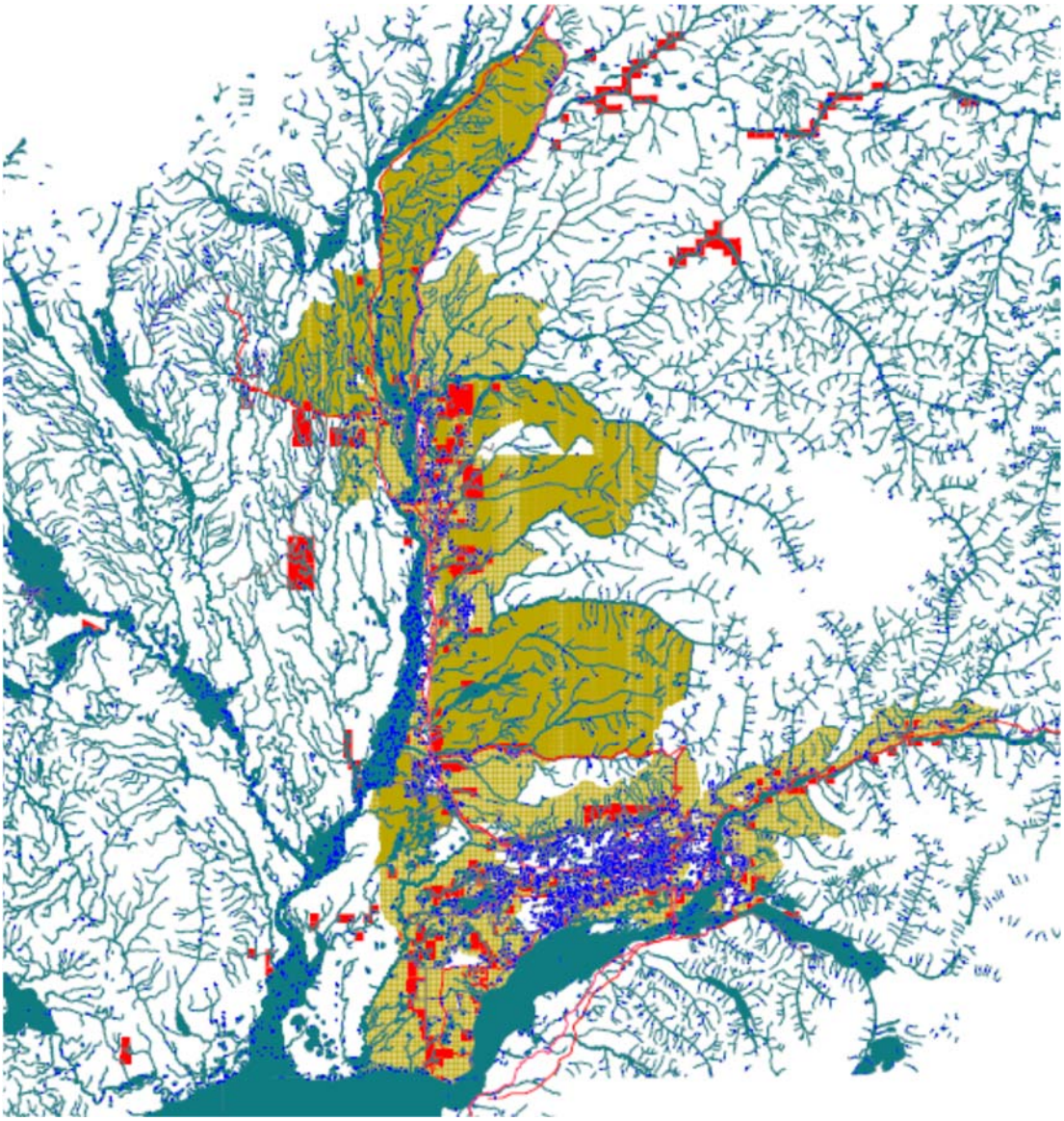
Scenario 3 is based on the preservation of 121,846 acres of key natural areas which are largely wetlands and/or aquifer replenishment areas. The borough is extremely “wet” -- with large-scale marsh areas, rivers, lakes and other areas with shallow aquifers. The MSB landscape currently includes many high-value natural areas without any federal or state protection. Using soil categories that identify areas as marsh, and considering other obviously valuable natural areas, the Great Land Trust identified all such key

natural areas in the MSB[28] and the top 20% were used in this scenario. These acres are shown in red in Figure 14. This scenario simulates their removal from development consideration and reduces population and dwelling unit growth accordingly.

Scenario 3 results in 21,669 fewer people. To generate this outcome as of 2050 the annual population growth rate input to the model is reduced to 1.69%.

Figure 14. Key natural areas preserved under Scenario 3

(preserved areas shown in red)



[28] http://www.greatlandtrust.org/whatwedo/prioritization.html

3.6 Scenario 4 - Transit-linked higher density nodes along the Parks Highway and eastern Knik Goose Bay corridor

In 2008, 32 percent of borough residents worked in Anchorage (Fried 2010). Many residents are beginning to use ride-sharing and mass transit opportunities in order to commute to work. High housing costs and the reduced availability of mortgage financing in the wake of the 2008 economic downturn have likely caused some local residents to consider more cost-effective and increasingly higher-density housing.

Scenario 4 is based on the hypothetical development of additional transit nodes along the Parks Highway and eastern Knik Goose Bay Road corridor to facilitate park-and-ride and higher-density, nodal residential land uses in the form of town centers in these areas. Potential nodes are shown in Figure 15. The nodal development zones are modeled with a multiplier of residential development in these areas to simulate more frequent use of duplexes, four-plexes, small apartment buildings and other higher-density housing types.

Bingham (2012) calculates that this scenario would result in 14,140 more people, but also a 25% savings in infrastructure capital costs per capita for these additional people. The 25% savings potential is documented in Table 5. The fiscal model projects only the effect of the 14,140 additional people on education costs. (To generate this outcome by 2050 the annual population growth rate input to the model is increased to 2.18%.) The higher projected education costs are compared to the infrastructure savings in section 3.9, below.

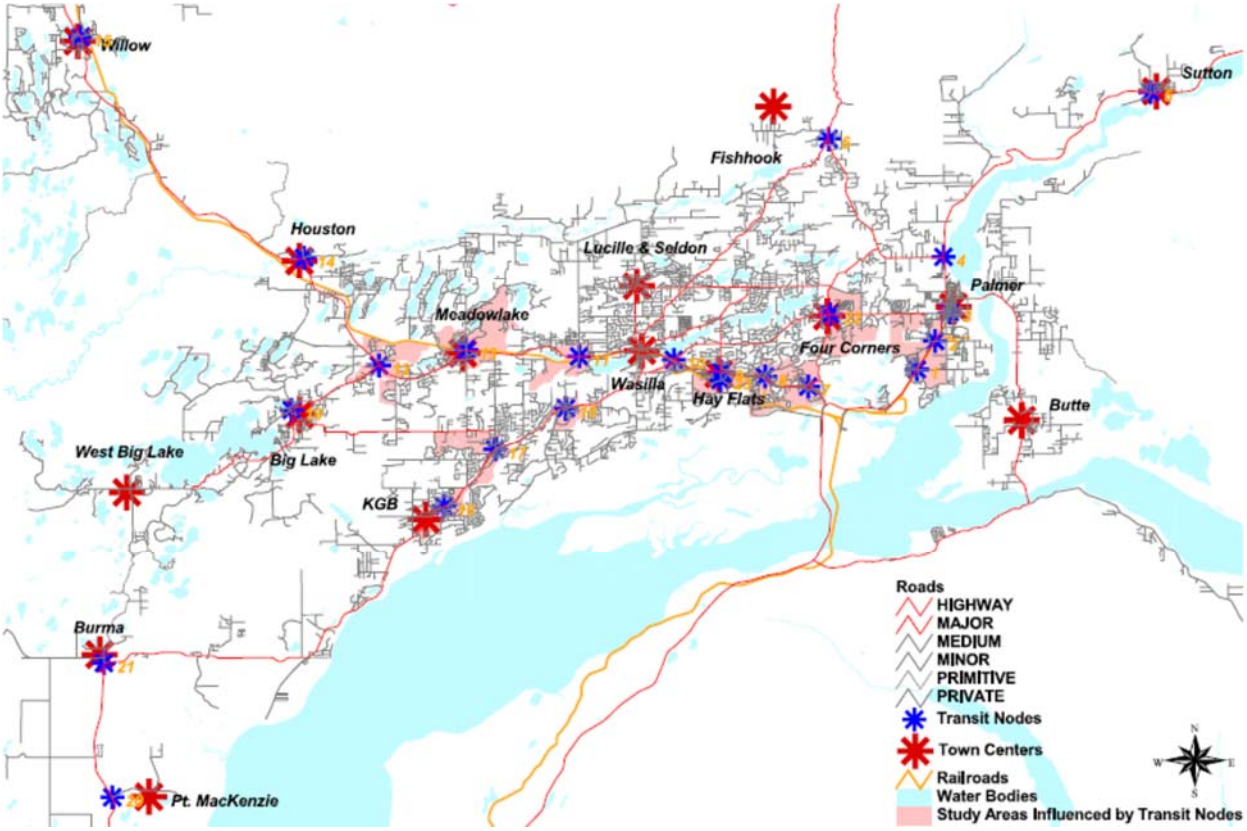
Table 5. Potential infrastructure savings from nodal development

Information source	Type of infrastructure	% savings
Dr. David Gallow - California State University	Water and Sewer	**22%**
Todd Littman - Victoria, BC Transport Policy Institute	Roads	36%
	Water and Sewer	9%
	Fire Stations	54%
	Recreation Centers	46%
	Schools	19%
	Total	**33%**
Transit-oriented Communities - A Blueprint for Washington State - Futurewise Et. Al.	Roads	25%
	Utilities	20%
	Schools	5%
	Average	**17%**
Average potential savings from nodal development		**25%**

source: Bingham (2012)

Figure 15. Potential nodes for Scenario 4

(transit nodes in blue, town centers in red)



3.7 Scenario 5 – Higher density in the western KGB Road corridor and Point MacKenzie area, consistent with KABATA estimates

This scenario simulates the outcome that results from assuming that the Knik Arm Bridge is built and taking the Knik Arm Bridge and Toll Authority (KABATA) population and household estimates for Point MacKenzie in 2035 at face value.[29] Density in the Point MacKenzie area would simply be increased without addressing urban infrastructure needs. The general assumption is that pent-up residential demand in Anchorage and the residential land use patterns prevalent there would spill across the bridge.

[29] The KABATA population projections are associated with their 2011 financial and toll revenue projections. The data for projected population by community council are available as a GIS data layer named "The Knik Arm Bridge TAZ Numbers" at http://www.arcgis.com/home/webmap/viewer.html?webmap=ac12e1bb0f12429087168410467b0e48

Scenario 4 results in 23,270 more people in 2050. To generate this outcome the annual population growth rate input to the model is increased to 2.30%.

3.8 Scenario 6 - Significantly lower densities in the North Susitna Valley consistent with an average 75% reduction in density from the base case.

This scenario addresses rural preservation in the North Susitna Valley by simulating a reduction in ultimate dwelling densities. The percentage reduction is lower near the Parks Highway and Talkeetna Spur Road, and progressively higher toward undeveloped mountainous areas. The average reduction is 75%.

Residents in the North Susitna Valley strongly value the rural lifestyle, with many opposed to significant residential density in their area extending from Willow to Talkeetna. Bingham's base case GIS build-out model populates the extensive vacant land available there as it does for the land elsewhere in the Borough. Good soil and large acreages create a significant impetus for population and dwelling unit growth through build-out in the absence of a rural preservation mechanism.

Scenario 6 results in a decrease (of 75%) from the projected base case North Susitna Valley built-out population of 83,687, which is a decrease of 62,765 people. To generate this outcome as of 2050 the population annual growth rate input to the model is reduced to 0.99%.

3.9 Results from alternative scenarios

Summary of assumptions

Table 6 summarizes the six scenarios in terms of year 2050 population and the growth rates that were fed into the fiscal model to generate these population outcomes.

Table 6. Summary of alternative scenario assumptions

Scenario	Population in 2050	Higher or (lower) population vs. base	Population growth rate that yields the 2050 population
Base case	199,074		2.00%
1 Increased Density KGB PMK	241,571	42,497	2.52%
2 Farmland Set Aside	195,585	(3,489)	1.95%
3 Key Natural Priorities	177,405	(21,669)	1.69%
4 Nodal Development	213,214	14,140	2.18%
5 Bridge with Kabata Densities	222,344	23,270	2.30%
6 Low Density North Su Valley	136,309	(62,765)	0.99%

Results

Table 7 shows how the projected budget shortfall amounts differ from the base case under each scenario. For example, the increased population of 42,497 in Scenario 1 would increase the annual budget shortfall by $50.9 million in 2050, as compared to the base case budget shortfall. Conversely, under Scenario 6 – reduction of the North Susitna Valley area population by 75% in 2050 -- the annual budget shortfall would be reduced by 40% -- or $87.3 million -- compared to the base case amount. The cumulative savings from 2014 through 2050 under Scenario 6 are $1,179.9 million, or about 1.2 billion dollars.

Table 7. MSB budget shortfall under six land use scenarios, relative to base case

		Budget shortfall (millions of 2012 dollars)				
Scenario	Population in 2050	2020	2030	2040	2050	cumulative 2014-2050
Base case	199,074	17.6	73.1	140.9	217.7	3,395.6
Difference, higher or (lower), from base case:						
1. Increased Density KGB PMK	42,497	1.8	13.2	30.5	50.9	722.0
2. Farmland Set Aside	(3,489)	(0.1)	(0.6)	(3.8)	(5.6)	(65.1)
3. Key Natural Priorities	(21,669)	(1.4)	(7.4)	(16.6)	(28.3)	(400.0)
4. Nodal Development	14,140	0.4	5.1	10.5	17.7	248.5
5 Bridge with Kabata Densities	23,270	0.6	6.6	18.6	28.6	406.5
6. Low Density North Su Valley	(62,765)	(2.8)	(20.2)	(50.2)	(87.3)	(1,179.9)

Nodal development and infrastructure cost savings

The results shown in Table 7 for Scenario 4 -- Nodal Development -- reflect only the higher annual education expenses due to 14,140 additional people living in the borough. It is important also to consider the 25% infrastructure cost savings from nodal development as proposed by Bingham based on his literature review.

Bingham (2012) estimated a one-time infrastructure cost of about $2.7 billion to serve 14,140 additional people under base case land use patterns. (Most of this cost is for roads.) If these 14,140 additional people instead lived in nodal development areas, a savings of $675 million (25% of $2.7 billion) could be realized. This amount amortized over 30 years at 3% interest equates to annual infrastructure savings of $34.4 million relative to base case land use patterns.

This calculation highlights the importance of the “mitigation” aspect of nodal development. The effect of simply *adding* 14,140 people to the total MSB population is to increase the education-related budget shortfall by $17.7 million per year -- and there would also be significant additional infrastructure costs. However, if one starts from the premise that 14,140 more people are coming to the MSB no matter what, then the effect of *shifting* them from base case land use to nodal development is to save $34.4 million per year on infrastructure. In other words, by reducing the amount of settled land and the number of people outside the nodal areas, the fiscal shortfall caused by the increased population within the nodal areas is mitigated while the infrastructure savings remain. Of course, this mitigation strategy depends on a reasonably complete shift of infrastructure – especially roads. If density is only somewhat reduced outside the nodes but settlement still proceeds everywhere, there would be little or zero overall infrastructure cost savings from nodal development.

Sales taxes needed to cover shortfall

Table 8 summarizes the borough sales tax rates that would be needed to offset the shortfall. For example, under Scenario 3 – Key Natural Areas Preserved – the required sales tax rate in year 2050 is reduced from 16.8% to 16.4%. As previously noted, the purpose of showing required sales tax rates is simply to provide another way of understanding the magnitude of the funding shortfall and how it changes in different scenarios.

Table 8. Required sales tax rates needed to offset shortfall

(assumes $6,500 per capita annual taxable sales)

	Scenario name	Population in 2050	Additional or (reduced) population vs. base	Required sales tax rate to offset shortfall			
				2020	2030	2040	2050
	Base Case	199,074	0	2.5%	8.4%	13.3%	16.8%
1	Increased_Density_KGB_PMK	241,571	42,497	2.6%	9.0%	14.0%	17.1%
2	Farmland_Set_Aside	195,585	(3,489)	2.5%	8.4%	13.1%	16.7%
3	Key_Natural_Priorities	177,405	(21,669)	2.3%	8.0%	12.8%	16.4%
4	Nodal development	213,214	14,140	2.5%	8.7%	13.6%	17.0%
5	Bridge_with_Kabata_Densities	222,344	23,270	2.5%	8.7%	13.9%	17.0%
6	Low_Density_North_Su_Valley	136,309	(62,765)	2.3%	7.3%	11.3%	14.7%

4. Conclusions

Current situation and recent trends

The MSB fiscal model developed for this analysis focuses on education costs, which account for more than 80% of the total $345 million annual cost of all services provided to MSB residents. Currently the State of Alaska pays 70% of the education bill, which shields borough taxpayers from the high cost of additional students. Historical school expenditure data show that real school operating expenditures per student have generally increased during the past decade. In addition, the fiscal model projections confirm that additional students will drive up the need for new schools and ultimately increase the debt service *per student*.

Results of fiscal model projections

The projections clearly show that unconstrained population growth is fiscally dangerous for the MSB under its current tax structure and likely future State of Alaska funding patterns. Under a plausible base case with 2% annual population growth, a large funding shortfall develops and grows to more than $200 million real 2012 dollars by 2050. If a sales tax were used to offset this shortfall, the required rate would be 2.5% in 2020, increasing to 16.8% in 2050.

Alternative Scenario 3 – the preservation of key natural areas – represents a reduction in 2050 population of about 22,000 people relative to base case growth. The analysis suggests that this kind of modest change in land use could reduce the funding shortfall by $28.3 million per year in 2050 and generate a $400 million cumulative reduction of the burden placed on borough taxpayers between 2014 and 2050.

Alternative Scenario 6 – a 75% average reduction in developed land in the North Susitna Valley – demonstrates the effect of a more significant attempt to manage population growth. This scenario could reduce the projected funding shortfall by $87.3 million per year in 2050. The cumulative reduction in potential tax burden between 2014 and 2050 would be almost 1.2 billion dollars.

Important fiscal effects not captured by the model

While the quantitative analysis was focused on education spending needs and resources, it is important to keep in mind that any future funding shortfalls will likely be spread among other services as part of an attempt to maintain adequate school funding. Furthermore, it is likely that similar projected fiscal shortfalls would be generated by a more detailed analysis of local road construction, which has historically been highly dependent on state funding and for which a $500 million CIP list was recently approved

based largely on the needs of the *current* population. If state road funding drops along with education funding, the fiscal drag of high population growth could be significantly larger than projected here.

Finally, under the scenarios that preserve undeveloped land, the ecosystem services provided by those lands -- such as fish and wildlife habitat, water filtration, and food production -- would remain for the benefit of MSB residents. A recent study (Berman & Armagost 2013) shows that some of these ecosystem services boost existing MSB property values – a potential positive “price effect” of open land preservation that is not captured in the quantitative projections.

Overall conclusion

Funding future education, roads, and other services will be a challenge for the MSB as state funding declines with falling oil production. While a lower rate of population growth is not a fiscal cure-all, this analysis shows that land use policies that help protect and enhance land values while strategically managing population growth can help the borough to meet its fiscal challenges in the coming decades.

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Appendix A. Fiscal model parameters and model logic

The fiscal model is an Excel workbook, available from the author and/or posted to: http://iser.uaa.alaska.edu (search under "fiscal model")

Table A-1. Model parameters.

MSB fiscal model paramaters

Population			
MSB population growth rate	%/yr	2.0%	can be used directly
MSB birth rate	%/yr	1.5%	can be used in lieu of popgrowth
MSB death rate	%/yr	0.5%	can be used in lieu of popgrowth
MSB net migration growth	%/yr	1.0%	can be used in lieu of popgrowth
AK pop growth rate	%/yr	1.0%	determines dilution of state oil$
students per person growth	%/yr	0.0%	neg # means decline as per recent past
students per person low bound		0.160	
School cost per student growth rates			
instruction	%/yr	0.0%	(per student real dollars)
support and admin	%/yr	0.0%	(per student real dollars)
O&M of plant	%/yr	0.0%	(per student real dollars)
transportation	%/yr	0.0%	(per student real dollars)
other	%/yr	0.0%	(per student real dollars)

School size and construction cost		_K6	_712	
FT2 per student		110	169	
Capacity factor trigger		0.95	0.95	
schoolcost_1	$/ft2	602		
schoolcost_2	$/ft2		695	
schoolcost_3	$/ft2	500		
schoolcost_4	$/ft2		600	
decay rate of existing school stock	%/yr	0.0%		(positive # = decay)
future inflation	%/yr	2.0%		
bond interest rate	%/yr	3.0%		

School funding from SOA and fed			
School foundn total nom $ growth	%/yr	0.0%	(total nominal dollars for entire state)
pupil transportation per student	%/yr	-1.0%	SOA tries to keep up with inflation, fails
debt reimbursement fraction	%/yr	-1.0%	SOA tries to keep up with inflation, fails
per student federal school support	%/yr	0.0%	(real dollars)
Local revenue			
growth of assessed value per capita	%/yr	0.0%	
upper bound		120,000	was 89,381 in 2012
Bed and excise total taxes growth	%/yr	2.0%	(total real dollars)
Federal revenues for gen govt ops	%/yr	0.0%	(total real dollars)
State revenues for gen govt ops	%/yr	-2.0%	(total real dollars)
Chgs for svcs & other - per capita	%/yr	0.0%	(total real dollars)
per capita growth rates:			
General Government expend.	%/yr	0.0%	(per capita real dollars)
Public Works expend.	%/yr	0.0%	(per capita real dollars)
Emergency Services expend.	%/yr	0.0%	(per capita real dollars)
Public Services expend.	%/yr	0.0%	(per capita real dollars)
Debt service other than schools	%/yr	0.0%	(per capita real dollars)

Population. The model determines MSB population using either an annual growth rate (which can be changed by the user to vary over time), or by using a components-of-change demographic computation of births minus deaths plus assumed in-migration. Total Alaska population is also projected, in order to compute school foundation funding per MSB student.

Students are estimated as

students per person x *population*

The students per person ratio can be set to decline over time toward a pre-set floor. Total students are apportioned to K-6, 7-12, and correspondence using current ratios.

School operating expenses are projected using user-specified initial amounts and annual growth rates for $ per student for several expenditure categories.

School debt service is calculated based on both 1) the schedule of required future payments that exists in the initial year; and 2) new debt service due to new construction.

School construction is determined using an annual "shortfall" analysis. Need is determined separately for K-6 and 7-12 space using numbers of students and required square feet per student (per SOA DEED guidelines). When need exceeds 95% of capacity, new construction is undertaken in chunks of 44,000 square feet for K-6 space and 95,000 square feet for 7-12 space. (These numbers are based on analysis of planned MSB school projects). The user can input a specific sequence of building sizes to override these amounts.

Debt service on new construction is calculated using the input interest rate and a 20-year repayment period.

					2012			2012	start year
					Initial	Growth		Year	
			param	Units	Value	Rate		2013	2014
People									
	Population								
		AK total population			732,298	1.0%		739,621	747,017
		births MSB	1.5%					1,407	1,447
		deaths MSB	0.5%					469	482
		net migration MSB			1,735	1.0%		1,752	1,770
		population by components			93,801			96,491	99,225
		population by direct growth			93,801	2.0%		95,677	97,591
		population						95,677	97,591
	Households								
		not used version _5							
	Students								
		students per person	0.160		0.185	0.0%		0.185	0.185
		students			17,338			17,685	18,038
		students_K6	49.8%		8,628			8,800	8,976
		students_712	40.7%		7,052			7,193	7,337
		students_corresp	9.6%		1,658			1,691	1,725
School Expenses									
	School operating expense per student								
		instruction			6,853	0.0%		6,853	6,853
		support and admin			3,209	0.0%		3,209	3,209
		O&M of plant			1,400	0.0%		1,400	1,400
		transportation			810	0.0%		810	810
		other			566	0.0%		566	566
		*total before debt service			12,838			12,838	12,838
		debt service (from below)			1,216			1,356	1,582

		param	Units	2012 Initial Value	Growth Rate		2012 Year 2013	start year 2014
School construction								
Capacity K6								
need_K6		110	ft2 million	0.949			0.968	0.987
capacity_K6				1.066			1.066	1.066
shortfall_K6		0.95		(0.063)			(0.045)	(0.025)
existing_K6		0%		1.066			1.066	1.066
additions of ft2 K6								
new_K6_1		0.044					-	-
new_K6_2		0.050					-	-
new_K6_3		0.050					-	-
new_K6_4		0.050					-	-
new_K6_5		0.050					-	-
new_K6_6		0.050					-	-
new_K6_7		0.050					-	-
new_K6_8		0.050					-	-
new_K6_9		0.050					-	-
new_K6_10		0.050					-	-
new_K6_11		0.050					-	-
new_K6_12		0.050					-	-
new_K6_13		0.050					-	-
new_K6_14		0.050					-	-
new_K6_15		0.050					-	-
new_K6_16		0.050					-	-
new_K6_17		0.100					-	-
new_K6_18		0.100					-	-
new_K6_19		0.100					-	-
new_K6_20		0.100					-	-
total additions K6			ft2 million				-	-
Debt svc cost of additions K6			$ per ft2					
new_K6_1			0				-	-
new_K6_2			0				-	-
new_K6_3			602				-	-
new_K6_4			602				-	-
new_K6_5			602				-	-
new_K6_6			602				-	-
new_K6_7			602				-	-
new_K6_8			602				-	-
new_K6_9			602				-	-
new_K6_10			602				-	-
new_K6_11			602				-	-
new_K6_12			602				-	-
new_K6_13			602				-	-
new_K6_14			602				-	-
new_K6_15			602				-	-
new_K6_16			602				-	-
new_K6_17			602				-	-
new_K6_18			602				-	-
new_K6_19			602				-	-
new_K6_20			602				-	-
capital outlay cost of additions K6							-	-

	param	Units	2012 Initial Value	Growth Rate	2012 Year 2013	start year 2014
Capacity 712						
need_712	169	ft2 millior	1.195		1.219	1.243
capacity_712			1.513		1.513	1.513
shortfall_712	0.95		(0.243)		(0.219)	(0.195)
existing_712	0%	decay%/y	1.513		1.513	1.513
additions of ft2 712						
new_712_1	0.095				-	-
new_712_2	0.095				-	-
new_712_3	0.095				-	-
new_712_4	0.095				-	-
new_712_5	0.095				-	-
new_712_6	0.095				-	-
new_712_7	0.095				-	-
new_712_8	0.095				-	-
new_712_9	0.095				-	-
new_712_10	0.095				-	-
new_712_11	0.095				-	-
new_712_12	0.095				-	-
new_712_13	0.095				-	-
new_712_14	0.095				-	-
new_712_15	0.095				-	-
new_712_16	0.095				-	-
new_712_17	0.095				-	-
new_712_18	0.095				-	-
new_712_19	0.095				-	-
new_712_20	0.095				-	-
total additions 712		ft2 million			-	-
Debt svc cost of additions 712		$ per ft2				
new_712_1		0			-	-
new_712_2		695			-	-
new_712_3		695			-	-
new_712_4		695			-	-
new_712_5		695			-	-
new_712_6		695			-	-
new_712_7		695			-	-
new_712_8		695			-	-
new_712_9		695			-	-
new_712_10		695			-	-
new_712_11		695			-	-
new_712_12		695			-	-
new_712_13		695			-	-
new_712_14		695			-	-
new_712_15		695			-	-
new_712_16		695			-	-
new_712_17		695			-	-
new_712_18		695			-	-
new_712_19		695			-	-
new_712_20		695			-	-
capital outlay cost of additions 712					-	-
Debt Service						
existing debt service					24.0	28.5
debtservice_K6					-	-
debtservice_712					-	-
debtservice_schools					24.0	28.5
capital outlay schools		cum total	1,394.1		-	-

Local government revenues (non-school). Property taxes are based on taxable assessed value per person, which can be input as a growing number to simulate nonresidential property development. The mill rate remains constant (although the user could change that formula). Bed and excise taxes, state assistance for general government ("municipal revenue sharing") and federal assistance are based on current amounts and user-specified growth rates.

Local government expense (non-school). Local general government expenses are based on current initial amounts and user-specified growth rates for expenditures per capita.

Local contribution to education is determined as the available locally-generated revenue less local general expenses. Local share of school debt service is included in this number in the model.

				2012		2012	start year
				Initial	**Growth**	**Year**	
		param	**Units**	**Value**	**Rate**	**2013**	**2014**
Local Govt Revenues and Expenses							
Local government revenue							
Taxable assessed value per person			$	89,381	0.0%	89,381	89,381
			max:	120,000			
Total assessed value			$million	8,384		8,552	8,723
Mill rate incl SA				12.3702		12.3702	12.3702
Property tax			$million	103.7		105.8	107.9
Bed and excise taxes			$million	6.2	2.0%	6.3	6.4
Federal revenues for operations			$million	3.3	0.0%	3.4	3.4
State revenues for operations			$million	6.2	-2.0%	6.1	5.9
Charges for services & other		0.0%	$million	6.4		6.52	6.65
Total revenue for ops & schools				125.8		128.0	130.3
Local general govt expenses							
General Government		0.0%		19.9		20.25	20.66
Public Works		0.0%		4.2		4.3	4.3
Emergency Services		0.0%		18.1		18.5	18.9
Public Services		0.0%		21.8		22.2	22.6
Debt service other than schools		0.0%		2.2		2.3	2.3
Total local govt expense				66.1		67.5	68.8
(excluding cap outlays)							
Available for support to schools							
excess of local rev over gen govt				59.6		60.5	61.5
*per student				3,438		3,424	3,410

Federal support for education. Federal support per student is based on current initial value and a user-specified growth rate.

State foundation support. First, *total funds in nominal dollars* available for support of all Alaska students are equal to a user-specified initial amount (taken in the reference case as the total foundation spending projected for FY14 by DEED[30]) and user-specified growth rate. Then this total nominal dollar amount is divided by the total projected number of Alaska students, which is pegged to projected Alaska population. The resulting per student foundation support amount is adjusted for projected inflation consistent with the rest of the model's use of 2012 real dollars.

Pupil transportation reimbursement is calculated from current per-student allowed amounts and a user-specified growth rate of reimbursement per student.

Fraction of debt service reimbursed starts out at the current statutory level of 70% and can be specified to decline at a fixed rate by the user.

Bottom Line Shortfall calculation. All federal and state funding is added up and compared to total education expenses. Then, the required remaining amount is compared to the available local contribution. If the remaining requirement exceeds the available local contribution, there is a shortfall in education funding. (Of course, the shortfall could also be thought of as occurring with respect to general government as well.)

[continues on next page]

[30] Alaska Department of Education & Early Development

"FY2014 Projected State Program Allocations based on Legislative Appropriations"

	param	Units	2012 Initial Value	Growth Rate	2012 Year 2013	start year 2014
School support						
Building blocks						
Federal support per student			1,138	0.0%	1,138	1,138
State foundation basic support						
Total funding statewide nominal dollars		$million	1,147	0.0%	1,147	1,147
Total AK students			129,472		130,767	132,074
Nominal dollars per student		$nominal			8,771	8,684
Real 2012$ perAK student		$			8,599	8,347
Pupil transportation per student			910	-1.0%	921	911
State debt reimbursement						
Debt reimbursement fraction			70%	-1.0%	69.3%	68.6%
Total debt service reimbursement					16.6	19.6
Total state and federal school support						
Federal			19.7		20.1	20.5
State foundation			141.9		152.1	150.6
State pupil transportation					16.3	16.4
State debt service					16.6	19.6
Total state and federal school support					205.1	207.1
Total school expenses						
instruction					121.2	123.6
support and admin					56.7	57.9
O&M of plant					24.8	25.3
transportation					14.3	14.6
other operating					10.0	10.2
debt service					24.0	28.5
Total school expenses	(remember TRS-PERS catchup $ removed)				251.0	260.1
Bottom line						
Required local support		$million			45.9	53.0
per student		$			2,596	2,938
per person		$			480	543
Local support available					60.5	61.5
Excess or (shortfall) of local support					**14.6**	**8.5**

Appendix B. MSB demographic trends

The MSB has been and currently is the fastest growing borough in Alaska.

Figure B-1. Comparative changes in population, 2000 – 2012

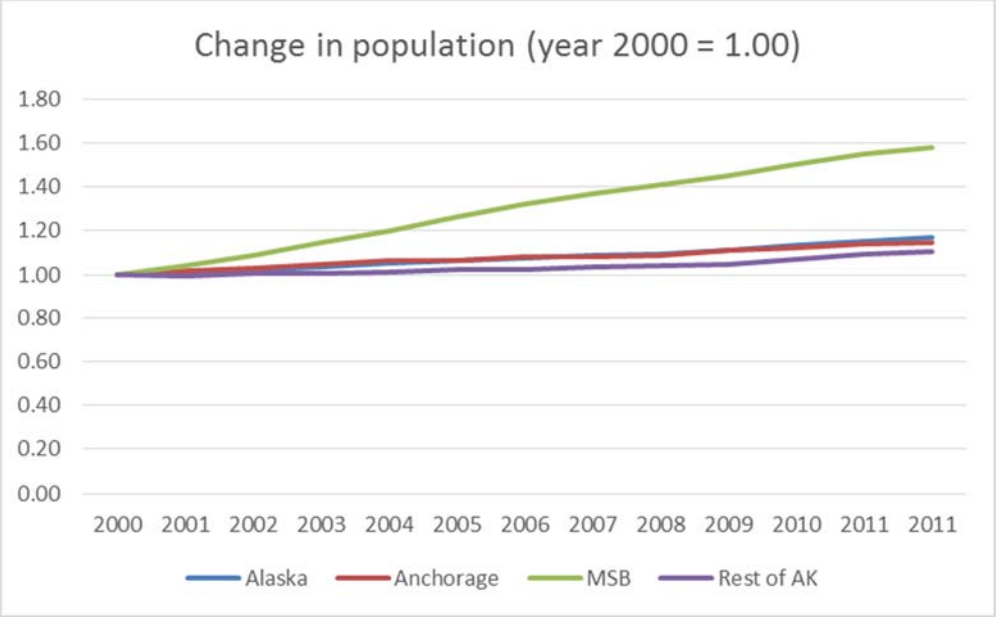


Figure B-2. Population growth rates, 2000 – 2012

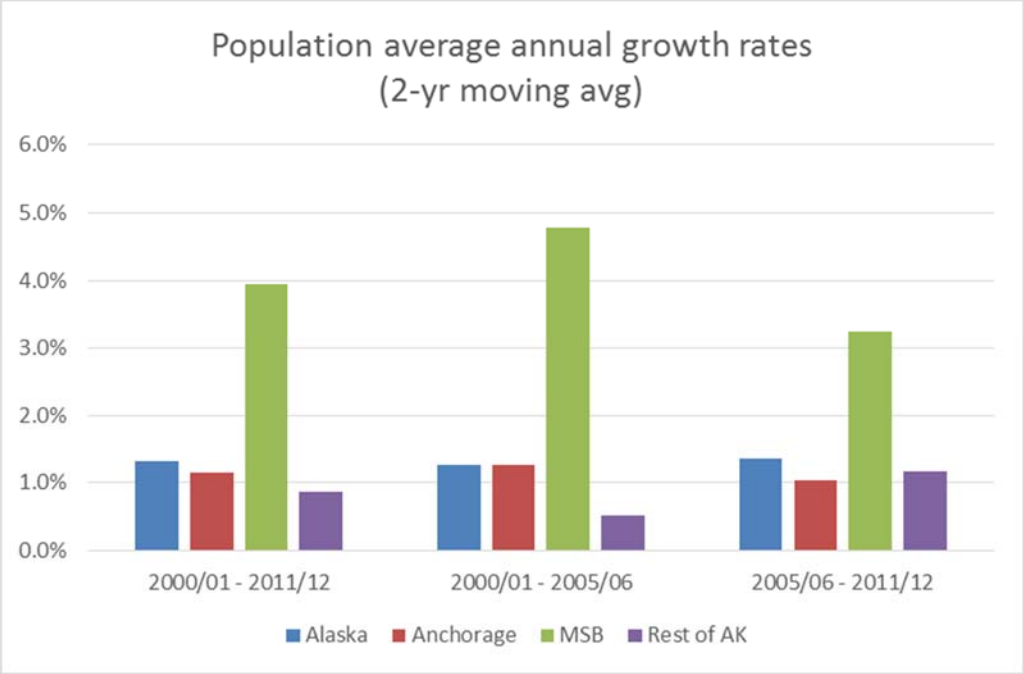
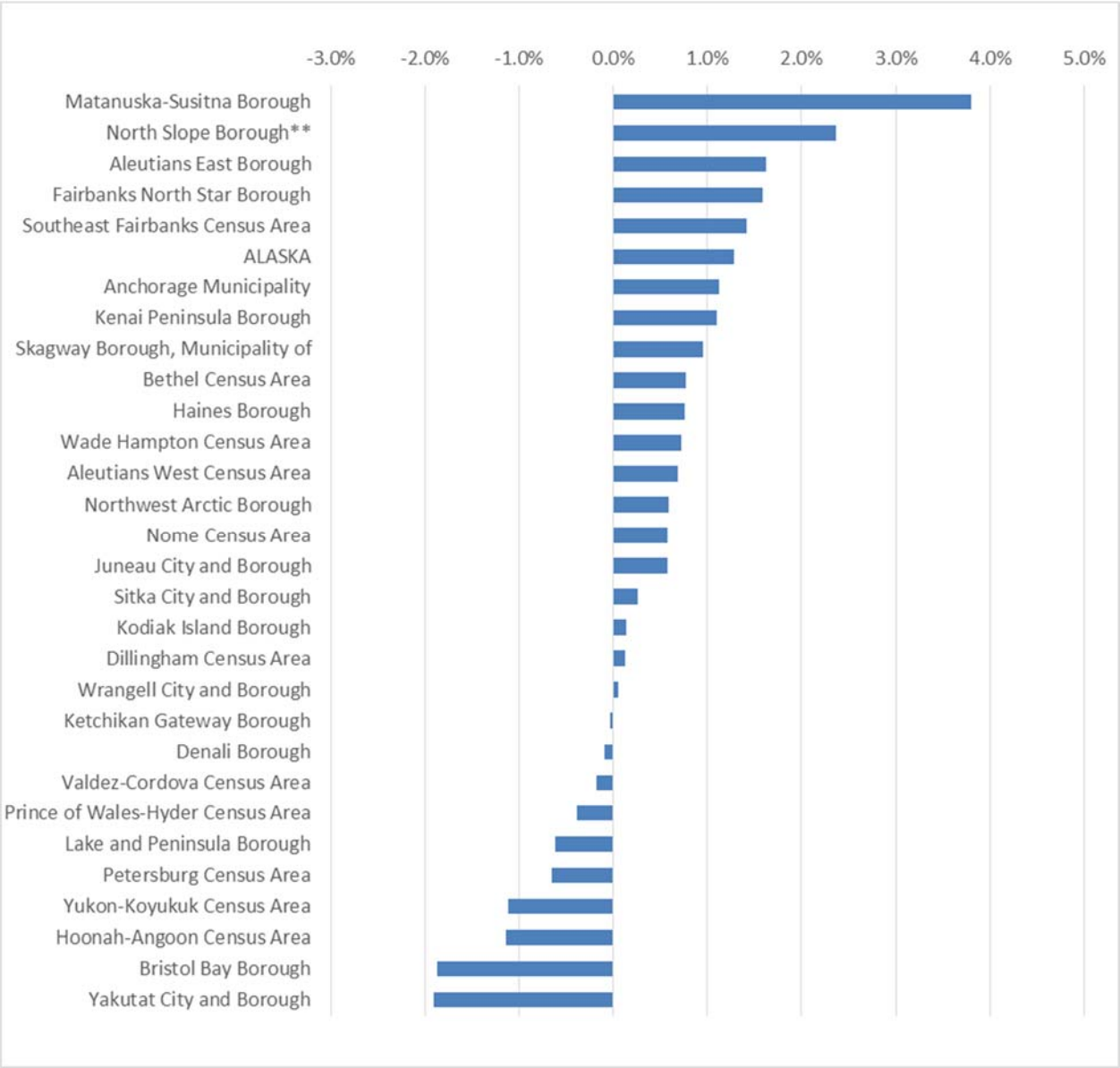


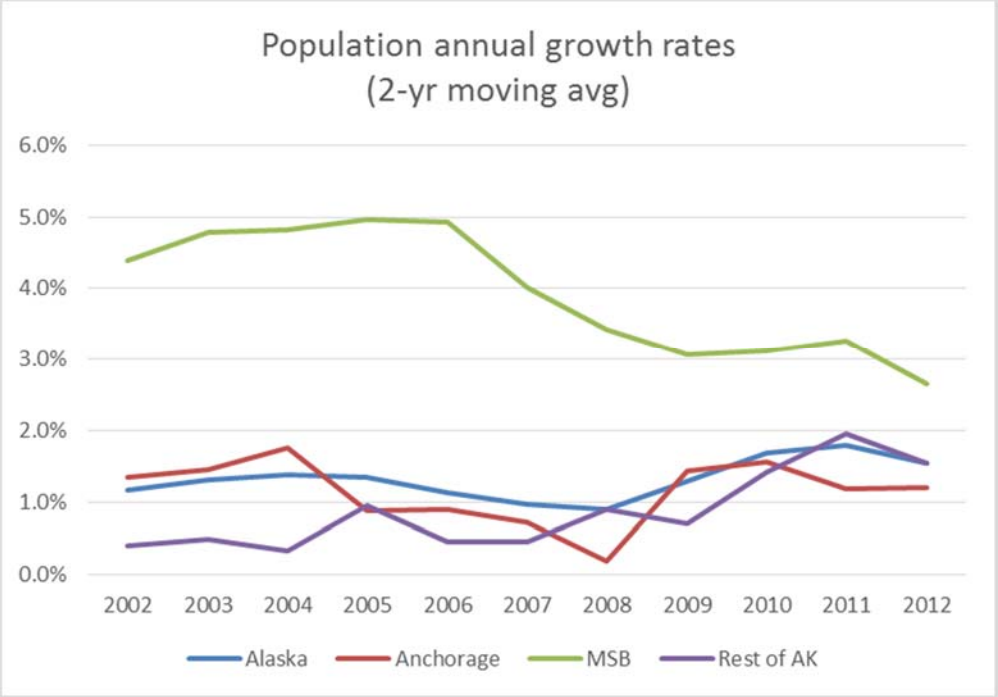
Figure B-3. Average annual growth of Alaska boroughs, 2000-2012



Source: Alaska Department of Labor and Workforce Development

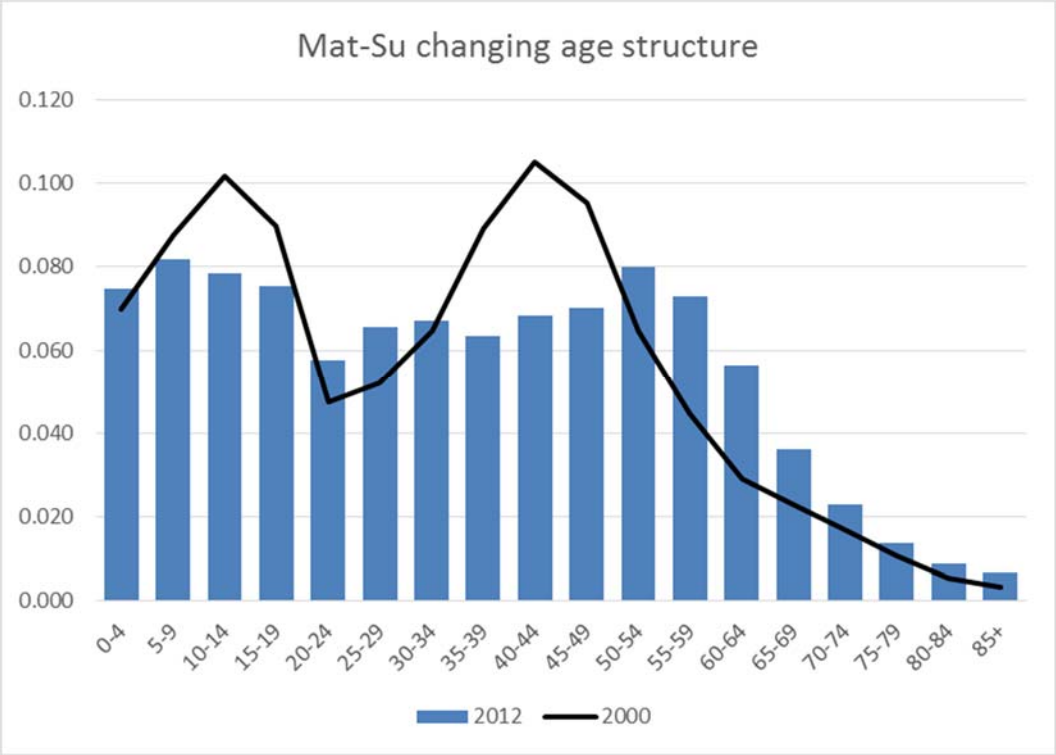
The MSB annual population growth (2-year moving average) rate has dropped from 4.8% per year in the first half of the 2000s to 3.3% in the second half, and to just above 2.5% in 2012. However, as of 2012 the MSB growth rate is still significantly higher than the rates for Anchorage and for the rest of Alaska.

Figure B-4. Convergence of MSB population growth rate toward Alaska average



The MSB age structure[31] is also evening out after being quite bimodal in year 2000 – a distribution that could be described as “parents” plus “children.”

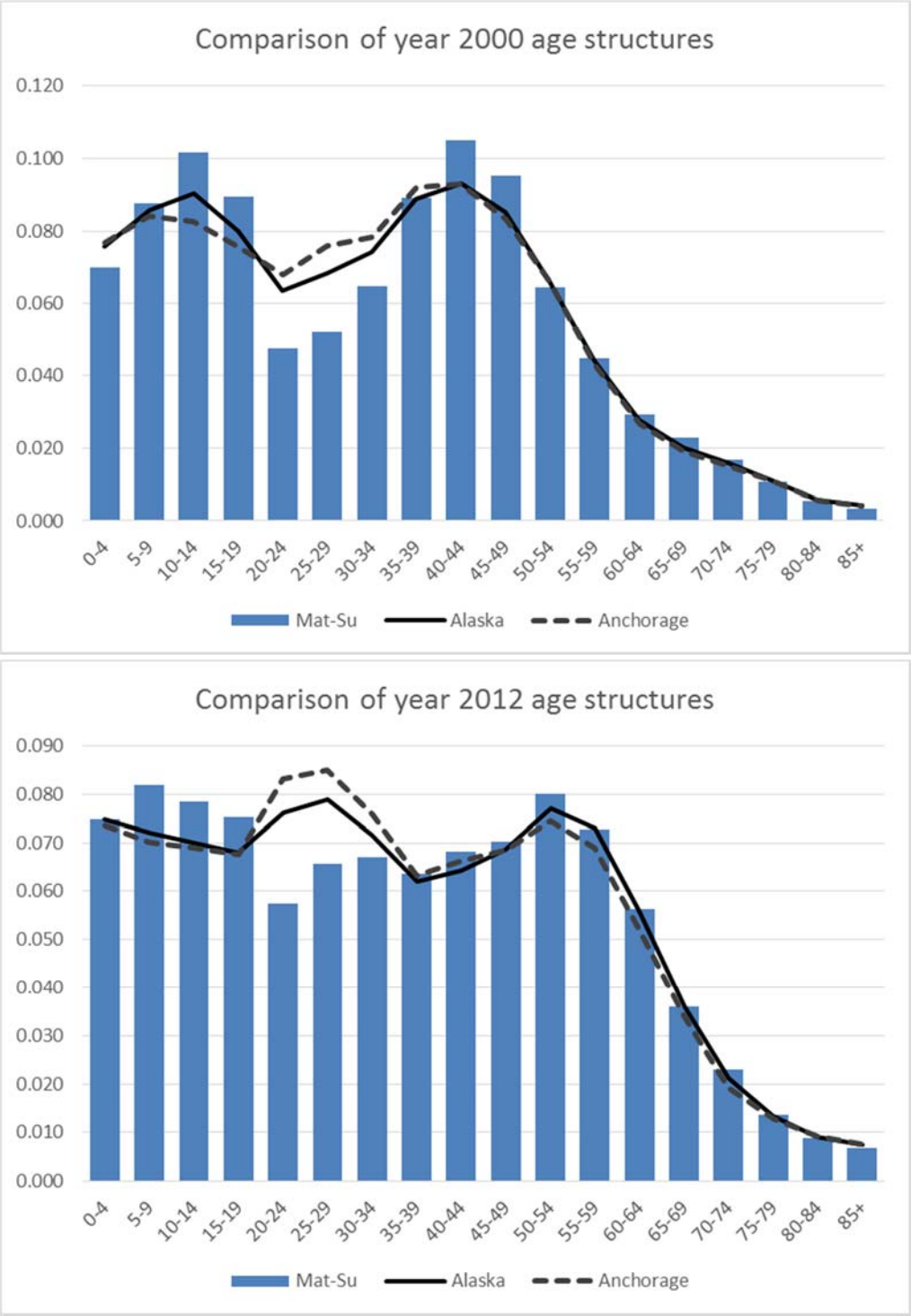
Figure B-5. MSB age structure in 2000 and 2012



[31] Population by age estimates are from Alaska Department of Labor and Workforce Development. http://laborstats.alaska.gov/pop/popest.htm

The MSB age structure has shifted during the past decade to resemble that of Anchorage and Alaska overall. All else equal, this shift would result in fewer students per capita.

Figure B-6. MSB age structure compared to Alaska and Anchorage, year 2000 and 2012



The MSB ratio of enrolled students to population has dropped from 0.2 in 2003 to 0.185 in 2012. However, this ratio is still higher than the Anchorage level of 0.163 students per capita.

Figure B-7. MSB students per capita, 2003-2012